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the OIL AND GAS JOURNAL

BJ engineering puts power to work for you...

BJ POWER TONG
spins and makes up drill pipe and casing with money-saving speed!

Here's another example of how BJ engineering puts power to work for you. With the BJ Power Tong on your rig you eliminate dangerous spinning rope and chain ...run pipe faster... cut manual labor.

Spins and makes up with one stab—Powerful air motor drive spins the joint tight.

One-man Operation—Tong man stabs and removes BJ Power Tong from joint by means of single control handle... *latch action is automatic!*

True Balance, Rugged Construction—Provides perfect alignment with the pipe... easy stabbing... has same exclusive balancing feature of other BJ Tongs.

Reversible—BJ Power Tong can be turned over and used when pulling out of the hole.

Wide Size Range—4"-7¾" O.D. drill pipe and casing can be used with BJ Power Tong thru 3 sizes of quickly changed lug jaws.

Talk with your BJ Representative to get detailed facts on how you can boost efficiency and cut costs with the BJ Power Tong.

Byron Jackson Co.

MEANS GINEERED IL TOOLS

PRICE 50 CENTS TABLE OF CONTENTS PAGE 53 **APRIL 12, 1951**

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The dramatic view at the left shows what happened when lightning struck a cone roof tank storing 76,200 bbls. of crude oil. If the tank had been equipped with a Horton Double-Deck Floating Roof, chances are it would not have been destroyed by fire.

This roof could have prevented the FIRE!

The following quotation is from a St. Louis, Missouri, newspaper:

"Lightning also struck a 130,000-bbl. gasoline storage tank. There was more than 100,000 bbls. of gasoline in the tank but . . . not more than 200 bbls. were lost. That was because of the tank's floating lid . . . *which rides on the surface of the gasoline."*

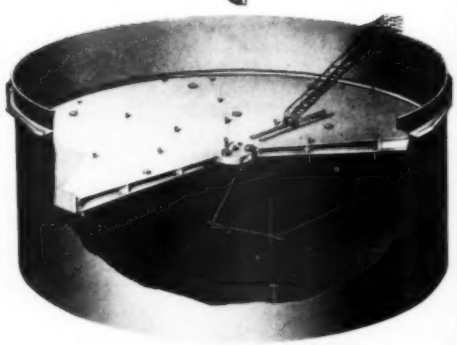
The "floating lid" referred to above is a Horton* Double-Deck Floating Roof.

Two important features were responsible for the performance of the Horton Floating Roof at East St. Louis. In the *first* place, a Horton Double-Deck Floating Roof floats directly on the liquid in the tank and blankets the surface. It reduces the fire hazard by eliminating the air necessary to support combustion.

The *second* feature is the Horton* seal that is used to close the space between the edge of the roof and the tank shell. This seal effectively prevents the escape of vapor around the rim of the deck. In so doing, it makes certain that an inflammable mixture will not persist above the roof. The Horton Seal is particularly effective in protecting the liquid in a tank from ignition by sparks or exposure fires.

You certainly wouldn't like to have some of your tanks destroyed by fire and think "If only I'd equipped them with Horton Floating Roofs." Bulletin B tells how these roofs can be used on new or old tanks. Write our nearest office for a copy.

**Trademark Registered in U. S. Patent Office.*



Cutaway drawing of a tank with a Horton Double-Deck Floating Roof.

The ALL-BETHLEHEM DRILLING BARGE

This all-Bethlehem drilling barge, complete in every detail, was towed to location immediately after commissioning ceremonies.

Today's best answer to the problem of purchasing a rig for shallow-water drilling

In previous years, the building and equipping of drilling barges often meant endless confusion and mixups—the net result being a troublesome, makeshift job in many important respects. But that necessary evil became a thing of the past with the advent of the all-Bethlehem drilling barge—an outfit created 100 per cent by *one* experienced builder, completely responsible for every detail.

In an all-Bethlehem drilling barge, the drilling equipment is furnished by Bethlehem Supply, one of the world's great manufacturers of rotary outfits; the barge is planned, designed, built, and equipped by Bethlehem's Beaumont shipyard. From the blueprint stage to final delivery, every move of both company units is completely coordinated. Gone are the complications that so often result from dealing with ten or twelve companies on the same building job.

One great advantage, of course, is the centralized responsibility—*ours*. Bethlehem alone answers to the customer and answers for everything. Another, perhaps even greater advantage, is the positive assurance of a well-built, thoroughly modern outfit—one that is all piped up, complete in every detail, ready for work when it leaves the yard.

Our engineers will gladly discuss details with oil companies or contractors whose program includes shallow-water drilling. For full information, call Bethlehem Supply or the Bethlehem Beaumont, Texas, yard.

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RESEARCH KEEPS **B.F.Goodrich** FIRST IN RUBBER

Photo courtesy Millers Falls Paper Co.

Where B. F. Goodrich grommet belts lasted 8½ years

B. F. Goodrich grommet V belts cut costs 20 to 50%

GROMMET V belts (made only by B. F. Goodrich) handled a transmission job on this drive 24 hours a day for 8½ years. The service is rough—starting causes shock loads, pulsations. The drive is fully equipped with B. F. Goodrich grommet V belts—here's where that extra strength and longer life come from:

No cord ends—A grommet is endless, made by winding heavy cord on itself to form an endless loop. It has no overlapping ends. Because most of the failures in ordinary V belts occur in the region where cords overlap, the endless cord section in a grommet V belt eliminates such failures.

Concentrated cord strength—All of the cord material in a B. F. Goodrich grommet multiple-V belt is *concentrated* in twin grommets, positioned close to the driving faces of the pulley. No layers of cords to rub against one another and generate heat; cord and adhesion failures are reduced.

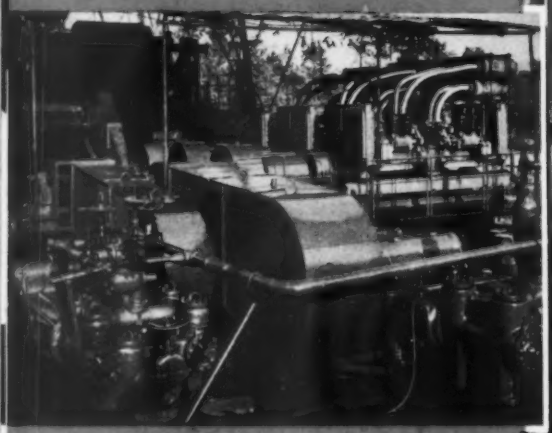
Better grip, less slip—Because a grommet is endless, a grommet V belt is more flexible, grips the pulleys better. Size for size, grommet multiple-V belts will give ⅓ more gripping power, pull heavier loads with a higher safety factor.

Only B. F. Goodrich has the grommet!—No other multiple-V belt is a grommet V belt (U. S. Patent No. 2,233,294).

Now available in C, D and E sections. See your local B. F. Goodrich distributor. Ask him to show you his "X-ray" belt that illustrates grommet construction clearly. *The B. F. Goodrich Company, Industrial and General Products Division, Akron, Ohio.*

Grommet V Belts BY
B.F.Goodrich
RUBBER FOR INDUSTRY

Drilling Contractors are known by the *EQUIPMENT* they keep!



"Oilwell" No. 96 Draw Works with No. 1500 Drive, now drilling below 12,000 feet near Canton, Mississippi. This is one of several "Oilwell" No. 96 Rigs used by Southeastern Drilling Company for heavy-duty drilling operations.

Today's deeper drilling horizons call for the flexible performance of

"Oilwell's" No. 96 Rig with No. 1500 Drive

● If you're drilling BELOW 10,000 FEET . . . take a careful, critical look at the new "Oilwell" No. 96 before ordering your next rig.

See it at work on a well. Ask the Driller how it performs . . . the Pusher about rigging-up, tearing-down and transporting time . . . the Owner about its upkeep.

That's the kind of get-the-facts comparisons we've been encouraging drilling contractors to make ever since the "Oilwell" No. 96 was introduced . . . for a thorough analysis of all draw works in this class will convince you, as it has so many others, that the No. 96 is the rig to buy. In fact, several firms are now standardizing on this rig for all their deep drilling operations.

ASK . . . your nearest "OILWELL" Representative about the features which enable "Oilwell" No. 96 Rigs to set the pace for outstanding performance . . . or write for Booklet No. 1-51.

FOR BEST RESULTS . . . complete your rig with the following "Oilwell" companion equipment . . . ENGINEERED for corresponding drilling depths:

- **No. 220-P Power Slush Pump**
- **No. S6-400 Swivel (400-ton capacity)**
- **No. 21-A or 26-HD Rotaries**
- **No. 500 or 580 Crown Blocks**
- **No. 400 or 480 Traveling Blocks (narrow, for maximum clearance)**
- **Brantly Hydraulic Feed Control with Automatic Regulator**

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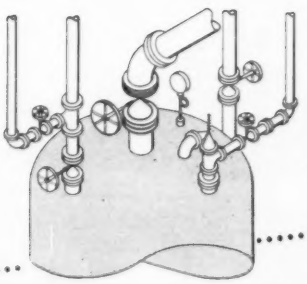
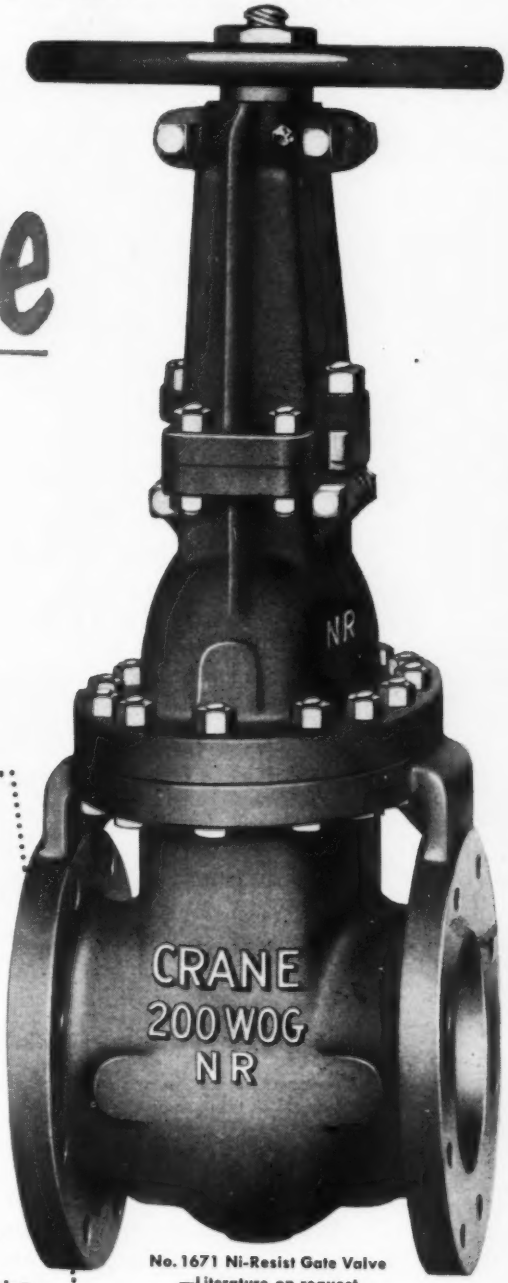
5 times-plus longer service

with dependable CRANE VALVES





No. 1671 Ni-Resist Gate Valve —Literature on request through your Crane Branch or Crane Wholesaler.

PROBLEM: To find a better replacement for valves that needed repairs every 2 to 3 weeks and failed completely in 3 to 4 months.

WORKING CONDITIONS: Valve exposed constantly to hydrochloric acid vapors at 50 psi, at approximately 280° F., while controlling raw material inlet line to starch converter.

SOLUTION: Crane No. 1671 Ni-Resist Cast Iron Gate Valve with Crane 18-8 Mo Alloy trim.

RESULT: On last inspection, after 19 months' service without one single interruption, Crane Ni-Resist valves were still in very good condition.

Here's an example of the long life and low-cost maintenance that make Crane Quality the best value in all types of valves.

More CRANE VALVES are used than any other make

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The Oil and Gas Journal, published Thursdays by The Petroleum Publishing Company. Entered as second-class matter September 1, 1910, at post office at Tulsa, Okla., under act of March 3, 1879. U. S. and foreign rates to the petroleum industry, $3 yearly. Copyright 1951.

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Laurence Arpin leads double life

It's a double *business* life, of course. Mr. Arpin operates a heavy-grading contracting firm on the West Coast, also sells a variety store product all over the U. S. "Managing *two* businesses is possible because of the extra working hours provided by my Bonanza," says Mr. Arpin. "This plane has *doubled* my earning ability.

"Now, after three years of ownership, I realize that not only can I afford the Bonanza—I can't afford to be without it."

How the C35 Bonanza has been *further* improved:

Higher performance levels. Take-off rating of 205 hp at 2,600 rpm, plus new Beechcraft metal propeller, improves short-field performance, gives the C35 Beechcraft Bonanza a rate of climb of 1,100 feet per minute.

Lower operating costs. Now you get 19.9 miles per gallon of fuel. Because there's less engine strain, there's less engine wear and fewer engine repairs. All-metal construction means ruggedness and extra safety.

Comfort, safety, style! Two-position rear seat with headrests. New Beechcraft-designed Hi-Strength safety harness, unmatched for comfort, protection, ease of movement. New all-over paint design now standard.

Want *more* reasons for Beechcraft superiority? Contact your Beechcraft distributor, or write Beech Aircraft Corporation, Wichita, Kansas, U.S.A.

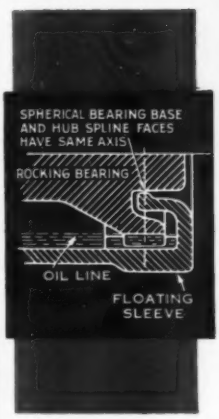
Higher top speed, 190 mph
Higher cruising speed, 175 mph
Longer range, 775 miles
Better fuel economy, 19.9 mpg

Beechcraft

BEECHCRAFTS ARE THE AIR FLEET OF AMERICAN BUSINESS

NEED "SPECIAL" COUPLINGS?

Koppers Can Help You Save Money With *Easily Modified* STANDARD Fast's Couplings



FOOLPROOF DESIGN: Instead of perishable oil seals, Fast's use a permanent metal-to-metal closure. Oil is always maintained at a safe level, whether the Fast's is running or standing still!

LOWEST COST: Fast's Couplings cost less per year because they normally outlast the equipment they connect. Original cost can be divided by 20 years or more. As one user says: *"We've had this Fast's Coupling since 1930 . . . it's apparently going to last forever!"* (Name on request.)

NEW DEVELOPMENTS: Fast's were the first gear-type couplings on the market. And they're first again with new designs developed by Koppers —like the revolutionary new Breaking Pin Coupling now available.

IF YOUR coupling problem looks tough—specify Fast's. Then Koppers' engineers can go to work, study your problem, and in many cases find a special coupling is not needed at all. Instead, these coupling specialists can often modify a *standard* Fast's Coupling and save you important money!

Standard Fast's Couplings can be modified for hundreds of unusual applications. Records kept over the past 31 years prove that Fast's Couplings outlast the equipment they connect. Fast's still maintains its original design, without basic change or sacrifice in size or materials.

Don't take chances. Whether your application calls for special or standard couplings, specify Fast's. For full information and specifications, write for your copy of Fast's free catalog today!

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THE ORIGINAL GEAR-TYPE

Couplings

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Gentlemen: Send me Fast's Catalog which gives detailed descriptions, engineering drawings, capacity tables and photographs.

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City.....*Zone*.....*State*.....

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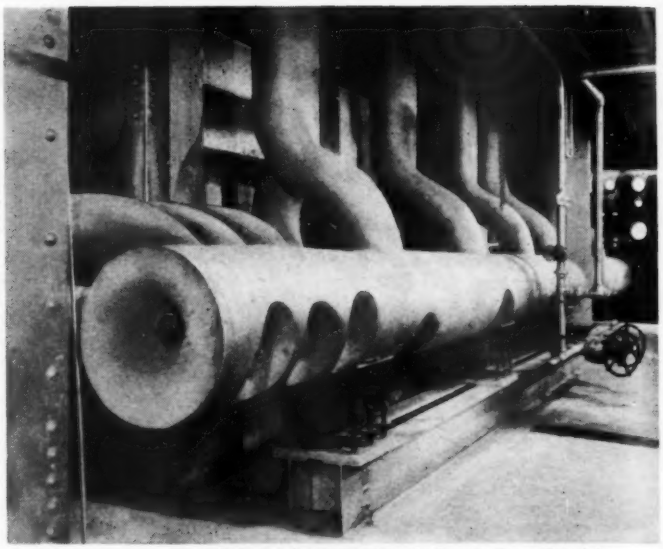
KEASBEY & MATTISON INSULATIONS DELIVER MORE HEAT AT LESS COST!



Boiler and furnace header in the Riverside Power Plant, Lake Charles, La., of the Gulf States Utilities Corporation, Beaumont, Texas. **Insulation Contractor:** Armstrong Cork Company.

Whatever your heat insulation problem, you'll find a Keasbey & Mattison covering that will solve it better. Consider the two K&M Insulations used in the above installation, for instance:

"FEATHERWEIGHT®" 85% MAGNESIA

Keasbey&Mattison"Featherweight"85%Magnesia withstands temperatures up to 600° F. without loss of insulating value. It is structurally strong, yet exceptionally light in weight. Alternate heating and cooling, wetting and drying does not effect its insulating properties. Its thermal efficiency remains unaffected after years of service.

HY-TEMP COMBINATION

This efficient and practical insulation combines the high heat-resistant properties of Keasbey & Mattison Hy-Temp with the superior insulating qualities of "Featherweight" 85% Magnesia. This makes Hy-Temp Combination Insulation suitable for exacting temperature control up to 1900° F.

Your Keasbey & Mattison Distributor — who is an experienced applicator — will be glad to give you complete information on these or any K&M Insulations. Or, write us direct.

Nature made Asbestos . . .
Keasbey & Mattison has made it serve mankind since 1873

K&M best in asbestos ®

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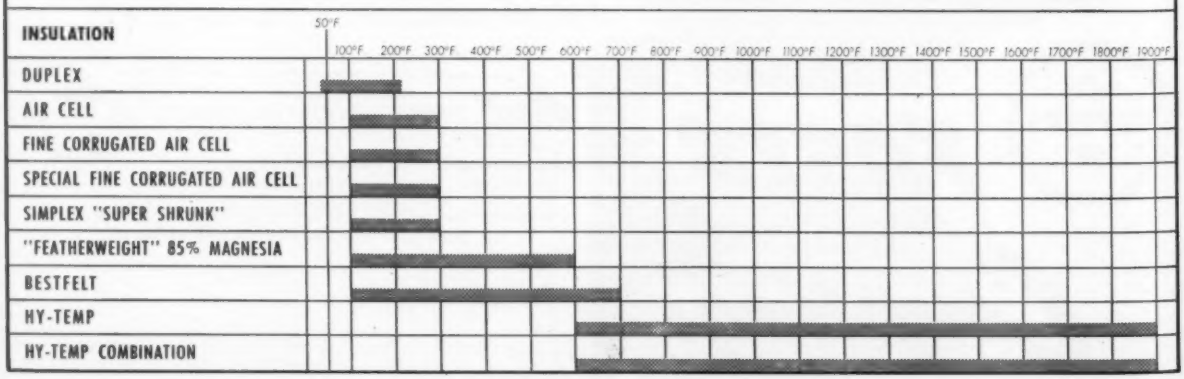
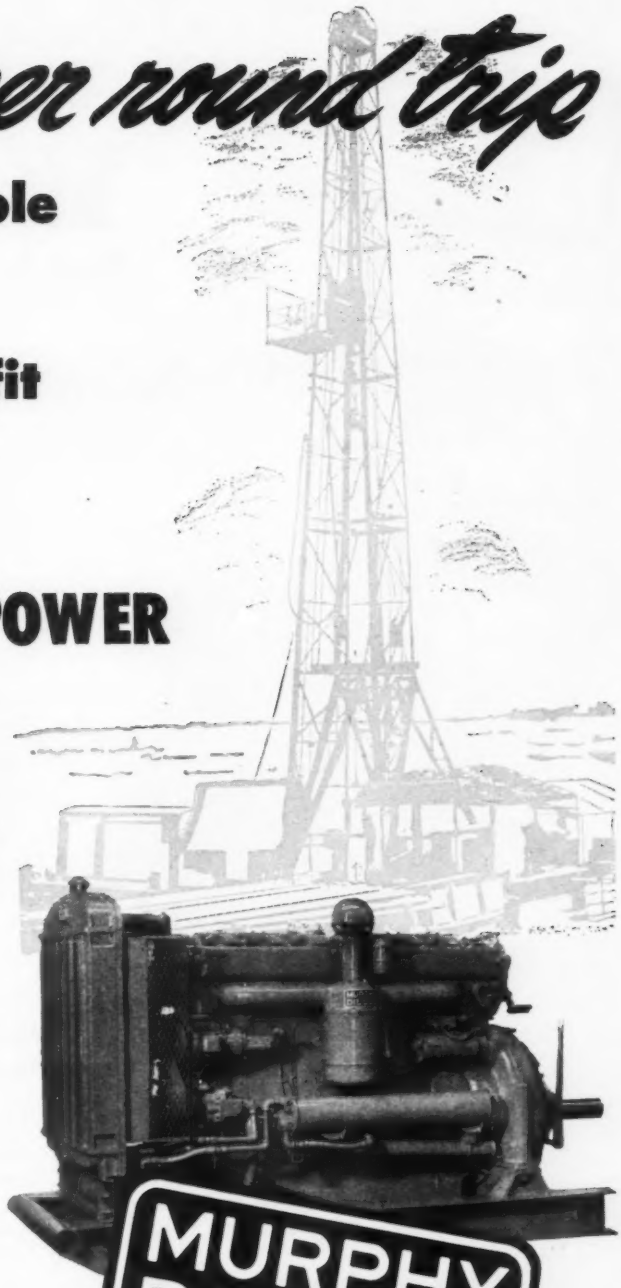
THERE'S A KEASBEY & MATTISON INSULATION FOR EVERY NEED



Less time per round trip

means more hole per day and more profit for you with

MURPHY DIESEL POWER



WHEN you have Murphy Diesel Power on the end of a string of pipe, you have the kind of power that really takes hold and gets the pipe out in a hurry . . . and that means you'll make more hole in less time. The key to Murphy's responsiveness to power demands is its hydraulic servo-type governor in combination with such features as "true" diesel operation . . . unit fuel injection . . . four valves per cylinder . . . and many others.

Equally important is the Murphy Diesel's dependability and operating economy—it stays on the job longer and costs less per hour to operate.

The 36 page booklet *"10 Questions to Ask a Diesel Engine Salesman"* explains fully the advantages of Murphy Diesel design and what it can mean to you. Ask your Murphy Diesel Dealer for a copy or write direct.

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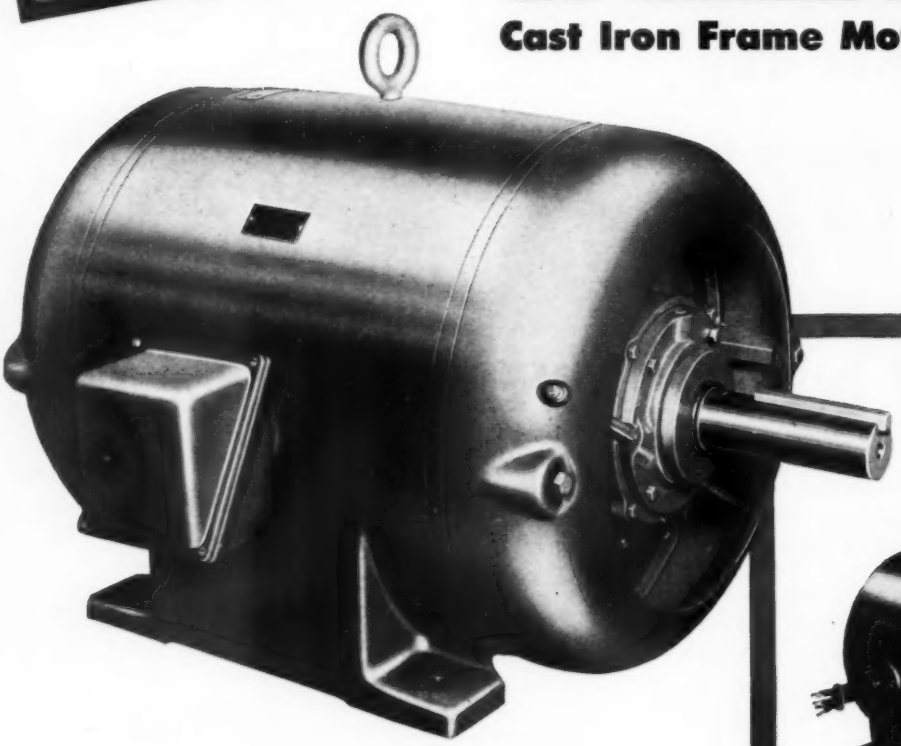
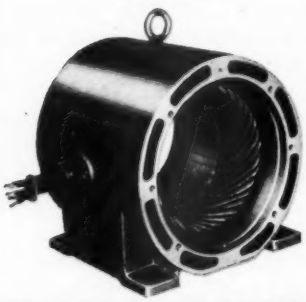
corrosion is no problem—

WHEN YOU USE

Wagner

Cast Iron Frame Motors





Rugged, one piece, corrosion-resistant, cast iron inner and outer frame, showing openings for ventilation.

They resist the damaging action of acids, fumes, moisture and other destructive elements

Wherever corrosion resistance is a "must" for motors—in chemical plants, oil fields, refineries, and industrial plants where tough operating conditions exist—Wagner Cast Iron Frame Motors are a sound choice.

They feature special varnish treated windings that resist acids and alkalies . . . a cast iron, gasket-sealed conduit box . . . and drain plugs in the endplates for easy removal of condensation from inside the motor. They are totally enclosed in rust and corrosion-resistant cast iron—even the nameplate is made of corrosion resistant material!

Wagner Cast Iron Frame Motors are available in ratings from 5 to 250 horsepower, in both standard totally-enclosed fan-cooled and explosion-proof designs.

Bulletins give full information on these, and other motors in Wagner's complete line. Thirty-one branch offices, located in principal cities, are ready to assist you in any motor application problem.

Wagner Electric Corporation
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CLAY, WATER AND WEIGHT MATERIAL—that was your drilling mud not many years ago. But with today's drilling problems, drilling fluids now are a full-time study. High-pH muds, red muds, lime-starch muds, salt-water muds, oil-emulsion mud, organic-colloid muds—all find a place in meeting today's varied drilling problems.

BUT YOU NEEDN'T WORRY—drilling muds are the full-time business of your thoroughly trained and experienced Baroid service man. His knowledge is yours whenever you want it. He can help you plan a complete drilling fluid program even before you spud in—your best bet for economical, trouble-free operations. He can advise on specific problems as they arise. His knowledge of drilling conditions and drilling muds has helped many operators save time, trouble and hard-earned dollars. Call your Baroid man—and lighten your load!

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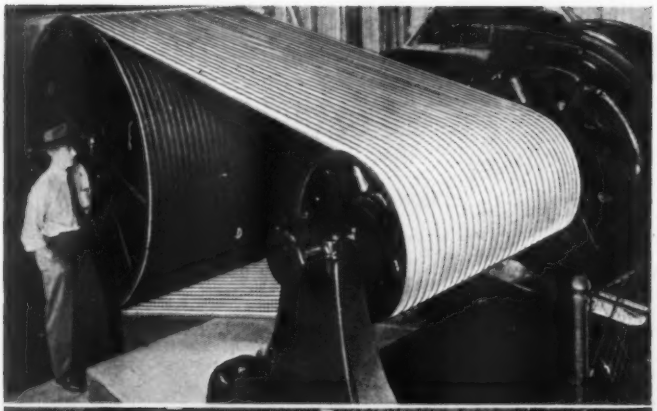
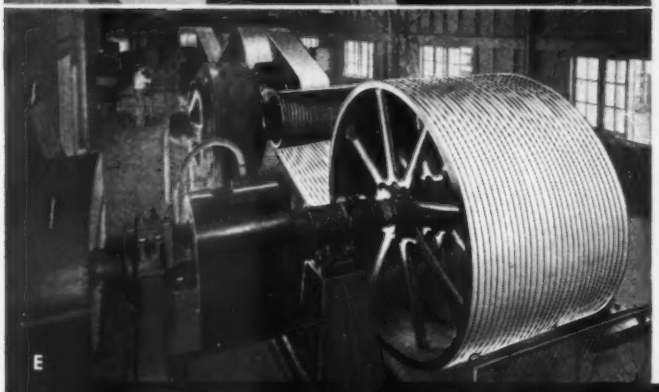
COMPLETE DRILLING MUD SERVICE





These 750-horsepower and 1000-horsepower Gates Vulco Rope Drives were originally installed in a West Coast butadiene plant in 1942 and ran nearly 5 years until the plant closed down. That plant is now running again—and the **original** Gates Vulco Ropes are once more producing the synthetic rubber so badly needed at this time.

This test shows how the Concave Side gives you a real saving in V-Belt costs

If you are interested in lower operating costs, make this simple test:—

Take *any* V-belt and bend it as it bends in going around a pulley. As the belt bends, grip its sides with your fingers and thumb. You will *feel* the sides of the belt *bulge out!*

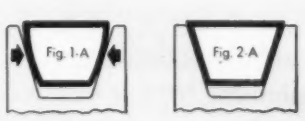
This bulging gives a straight-sided V-belt the shape shown in figure 1-A. (See diagrams at right.) Clearly, this shape does not fit the sheave groove. The sides of the bulging belt are forced to press unevenly against the V-pulley—and this concentrates the *wear* along the *middle* of the sides.

But when you bend a V-belt that is built with the *Concave Side*, you find that the sides become perfectly straight—as shown in Figure 2-A. This shape precisely fits the sheave groove.

Because there is *no bulging*, the sides of the Gates Vulco Rope always grip the *full* face of the V-pulley *evenly* and therefore wear *uniformly*—resulting in *longer belt life* and *lower belt costs for you.*

What Happens When a V-Belt Bends

Straight-Sided V-Belt Fig. 1 Fig. 2 **Gates Vulco Rope with Concave Sides**



How Straight-Sided V-Belt Bulges in Sheave-Groove. Sides Press Unevenly Against V-Pulley Causing Extra Wear At Point Shown by Arrows.

The Concave Sides Fill Out to a Precise Fit in the Sheave Groove. No Side Bulge! Sides Press Evenly Against the V-Pulley—Uniform Wear—Longer Life!

Only V-belts made by Gates are built with concave sides. Whenever you buy V-belts, be sure you get the V-belt with the Concave Sides—The Gates Vulco Rope!

CS-514

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Hose V-Belts
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IN ALL INDUSTRIAL CENTERS

THE GATES RUBBER COMPANY
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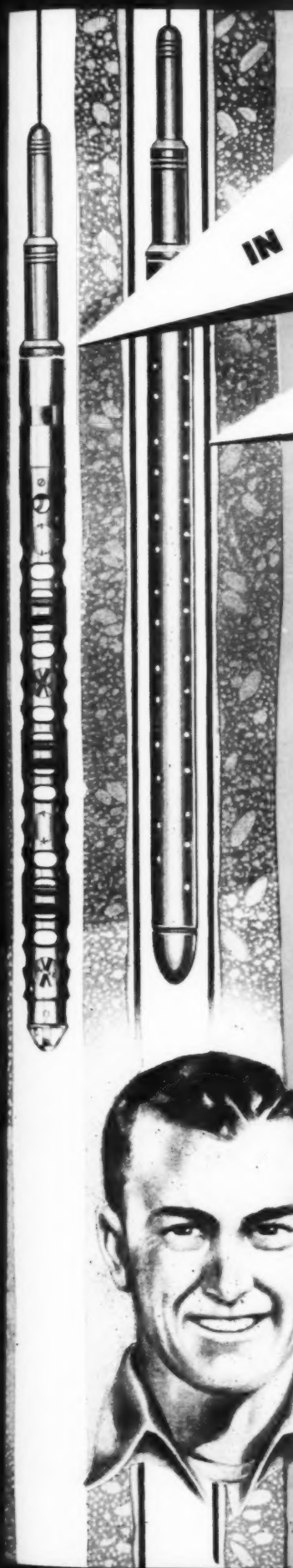


IN OPEN HOLE

IN CASED HOLE

EITHER WAY

KONESHOT

SHAPED-CHARGE PERFORATING

gives you

THESE *Plus* FEATURES

SEMI-SELECTIVITY The Lane-Wells F-2 Gun gives you both the deep penetration of shaped-charge perforating and semi-selective firing. This double-section gun gives you these choices — 48 shots in one 141" section, 24 shots in each of two 69" sections, or 48 shots in one 69" section.

PERFORATING EXPERIENCE Every possible well condition, every operating problem or hazard the oil fields can supply, has been met and solved in Lane-Wells 18 years experience on 144,000 perforating jobs. This experience works for you, on your jobs.

ACCURATE DEPTH MEASUREMENTS Lane-Wells depth measurements have been, for years, the accepted standard of the industry because of Lane-Wells exclusive calibrated cables, micro-adjustable measuring sheaves and other precise measuring instruments.

SAFETY Lane-Wells carefully engineered firing system provides *five* inter-connected firing switches. The gun is never "live" until positioned in the perforating zone. There are also special handling precautions for KONESHOT charges. These safety-minded features provide added protection both for your rig and for personnel.

ASK YOUR LANE-WELLS MAN!

LANE WELLS

TECHNICAL OILFIELD SERVICES

General Offices, Export Office and Plant • 5610 So. Soto St. Los Angeles 58, California

Los Angeles • Houston • Oklahoma City
Lane-Wells Canadian Co. in Canada
Petro-Tech Service Co. in Venezuela

AK-4

New Standards of

Safety and Service

Two Great New ROTARY HOSE

U. S. ROYAL 4—the only hose with...

• **Complete Kink Resistance**—with extreme flexibility from leakproof coupling to leakproof coupling—Royal 4, even on mast type rigs, resists all forms of kinking throughout its working length.

• **Highest Working Pressure**—anticipates and provides for the greater pressures of the newest pumps . . . introduces a new standard of safety to normal operations . . . serves as an additional safeguard should abnormal stress occur . . . eliminates costly switching to steel hose when high pump pressures are required.

• **Ultra-Flexibility**—highest quality wire-reinforced, fabric-and-rubber construction delivers a degree of flexibility unknown in other rotary hose—as conclusively demonstrated in exacting factory "sling" tests.

• **Double Reinforcing Wire Units**—Royal 4 incorporates 2 double wire layers (4 stress wires in all) to a unit—each layer with sufficient hydrostatic value to resist bursting should the other become damaged—each a hose in itself.

FIELD-PROVEN PERFORMANCES WITHOUT PARALLEL!

In the deepest fields—under the highest drilling pressures—Royal 4 has undergone two test years of toughest field service. Along the Gulf Coast, off its shore, throughout Texas, Louisiana and Oklahoma its many service lengths have been ideally evaluated for every type of rig. *And the result:* Not one single failure! Trouble-free performance records never possible before!

U. S. MATCHLESS CABLE-LAY

Here is U. S. Rubber's reply to oil industry requests for a better cable-reinforced hose.

In endless combination, varying sizes of wire, in varying numbers of strands, of varying degrees of flexibility were tested before the right result was achieved.

Now the vastly new and improved U.S. Matchless Cable-Lay has 19-strand highest tensile steel cable wire of unique twist-free construction . . . in plies that float in cushions of live, elastic rubber. Now it has a special carcass of soft, pliable yet amazingly strong cotton fabric. Result—improved flexibility, greater flex life and increased kink resistance.

Expert advice and service on the job are yours for the asking. See your "U. S." Distributor about these great new hose or write...

PRODUCTS OF U.S.RUBBER SERVING THROUGH SCIENCE

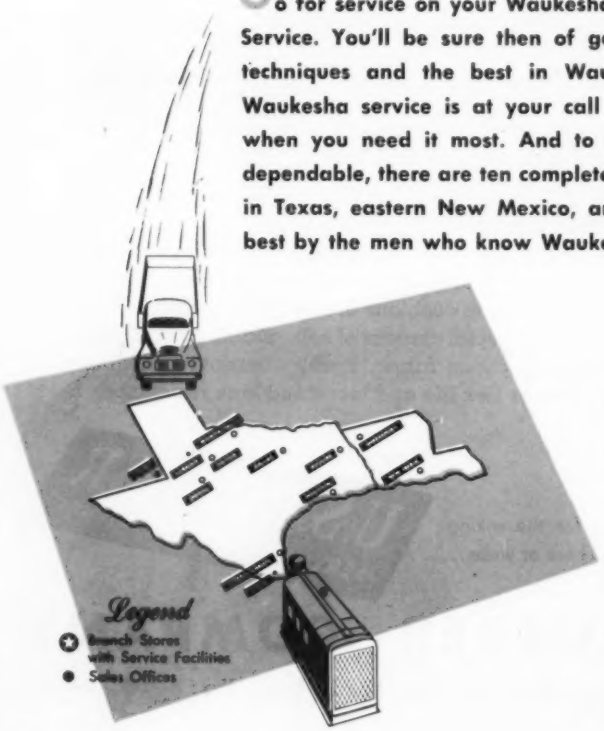
UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • Rockefeller Center, New York 20, N. Y.

YOU'RE TREATED BEST AT HOME

YOUR *Waukesha* ENGINE IS TREATED BEST AT HOME, TOO

So for service on your Waukesha Engine call Waukesha Sales and Service. You'll be sure then of getting the latest in factory-service techniques and the best in Waukesha factory-trained mechanics. Waukesha service is at your call twenty-four hours a day to help when you need it most. And to make Waukesha service fast and dependable, there are ten complete service shops strategically located in Texas, eastern New Mexico, and Louisiana. You will be treated best by the men who know Waukesha best.



WAUKESHA

SALES & SERVICE, INC.

1422 MAURY STREET • HOUSTON, TEXAS

EXCLUSIVE DISTRIBUTORS FOR WAUKESHA PRODUCTS IN TEXAS, LOUISIANA AND EASTERN NEW MEXICO

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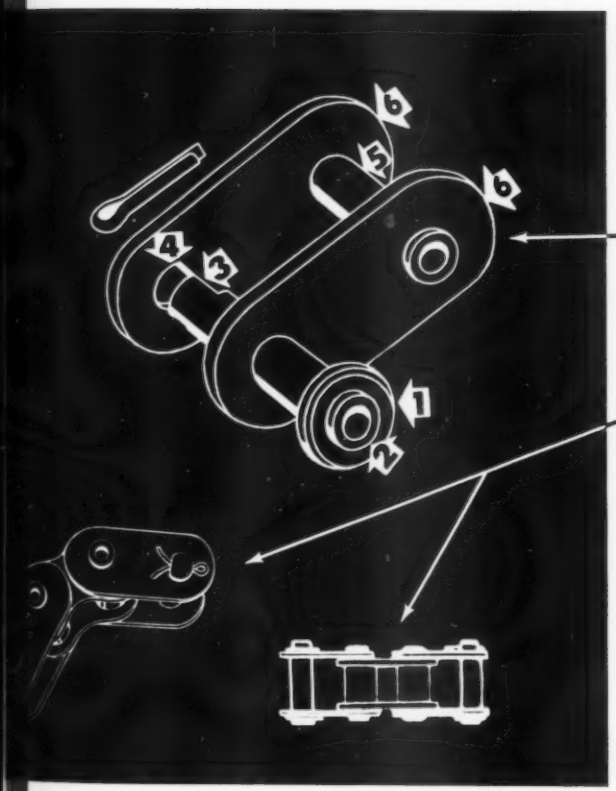
BALDWIN-REX "BA" ASSEMBLY MEANS . . .

EASY REPAIR . . .

EASY ADJUSTMENT



Baldwin-Rex "BA" Assembly Riveted Oil Field Roller Chains make possible the quickest, easiest field chain adjustments and repairs you've ever known.

The secret of the Baldwin-Rex "BA" Assembly is the Single Pin Connector Link. A washer (1) is spun over the head of the connector pin (2). The milled flat (3) at the cottered end of the pin fits into a special hole in the side plate (4). This combination holds the pin firmly in place, yet it's easy to remove because it's a "sliding fit" through the entire link except for the milled flat end. When the pin is removed, the riveted pin at the other end of the link (5) holds the side plates (6) firmly in place.

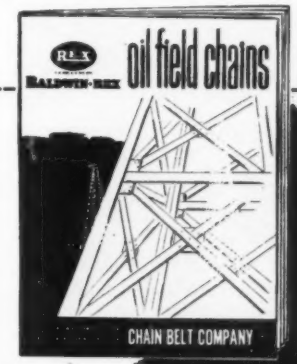
Here's your insurance against excessive loss of drilling time—"BA" 3-Pitch repair units. You can stock them in the doghouse—have them ready for instant use when you need them.

This unit consists of a standard roller link and two single pin connector links. If a link becomes damaged while in service, it can quickly be replaced right on the job by inserting one or more repair units. What's more, these "BA" repair units are interchangeable with any standard roller chain.

Remember, with the "BA" Assembly you get the longer life and greater strength of riveted chain with the greatest ease of assembly and disassembly yet devised, and in single strand, at even lower cost than with old style detachable chain.

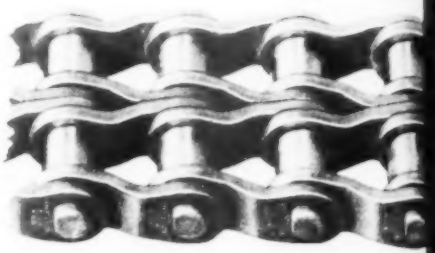
Our Bulletin 49-29 has all the facts on "BA" Assembly as well as Rex A.P.I. Chains and Rex Oil Field Chains. Write for it today or ask for it at your local supply store. Chain Belt Company 1619 W. Bruce Street, Milwaukee 4, Wis.

BALDWIN·REX
ROLLER CHAINS



FOR DRAW WORKS DRIVES

...REX 3125 CHAIN



REX 3125 CHAIN is especially designed for high speeds and high strength required of draw works chain drives. With its relatively short pitch—3⅛"—Rex 3125 Chain can operate at far higher speed than longer pitch chain, yet it has far greater load-handling capacity and shock resistant qualities than any other draw works chain.

These chains have unusually high ultimate strength —115,000 lbs. in single strand and 230,000 in double strand. They are built of highest quality alloy steels with all pins, bushings, rollers and side bars accurately heat treated in the most modern furnaces to develop maximum strength and resistance to wear.

Don't gamble with your draw works drives. Be sure to specify Rex 3125. Your Rex Field Sales Engineer or your local supply store will be glad to show you how Rex 3125 will give you lower costs per foot of hole drilled.

CHAIN BELT REX COMPANY

NOW! A REAL

OIL FIELD UTILITY PUMP

The Rex self-priming utility pump is thoroughly field-tested and field-proved. *5 outstanding features* make it the pump you can't afford to be without.

- *Simplest Pump Yet Designed.*
- *All Wearing and Moving Parts Accessible* with removal of one cover plate.
- Highly Portable . . . light weight yet sturdy construction.
- *Simplest, Most Positive, Leakproof Seal* ever designed.
- *The Only Pump which Maintains "New Pump" Efficiency its Entire Life.* The *exclusive,* patented Rex Adjustable Air Peeler does the trick.

Rex Oil Field Sales Offices Are Located in the Following Cities:
NEW YORK • TULSA • DALLAS • HOUSTON • MIDLAND • LOS ANGELES

CHAIN BELT COMPANY

BALDWIN-DUCKWORTH DIVISION
Springfield 2, Mass.

REX CHAIN & TRANSMISSION DIVISION
Milwaukee 4, Wis.

REX CONSTRUCTION MACHINERY DIVISION
Milwaukee 4, Wis.

XUM

XUM

FOR sheer toughness there's no other protective coating like Pittsburgh's TANKHIDE!

● **The petroleum industry** has for many years recognized the advantage of using light colored tank paints to minimize the evaporation loss of volatile liquids. With its unusually high heat and light reflection characteristics, Pittsburgh's Synthetic White TANKHIDE prevents the excessive heat absorption that brings about waste by evaporation.

● **Not only** is evaporation loss held to a minimum, but the brilliant white appearance of TANKHIDE is maintained throughout its long life by its self-cleaning action.

● **TANKHIDE** is a combination of intensely white titanium pigments and weather-resistant vehicles which make it a durable, lasting metal protective coating. It is designed for one-coat hiding. TANKHIDE can also be brushed where spraying is not possible.

● **The quick set** and firm character of the film during the drying period not only prevent the collection of dirt and insects but also keep damage due to rain, scuffing and abrasion at a minimum.

● **TANKHIDE** is also available in synthetic gray and black as well as in gray and black oil-base coatings for various purposes. These can be used on wood and metal surfaces with equally good results.

● **Pittsburgh** also offers a wide variety of quality finishes for every need in the petroleum industry. These include IRONHIDE, specially designed for the decoration and preservation of iron and steel structures; METALEAF Aluminum Paints with high light and heat reflecting value; service and bulk station paints; pump enamels and drum finishes.

● **Call on us** for expert advisory service. Our wide experience in supplying finishes for the petroleum industry can be helpful and save you time and money.

• • •

PITTSBURGH PLATE GLASS COMPANY
Industrial Paint Division, Pittsburgh, Pa.
Factories: Milwaukee, Wis.; Newark, N. J.; Springdale, Pa.; Houston, Texas; Los Angeles, Calif.; Portland, Ore. Ditzler Color Division, Detroit, Mich. The Thresher Paint & Varnish Co., Dayton, Ohio. Forbes Finishes Division, Cleveland, Ohio. M. B. Suydam Division, Pittsburgh, Pa.

PPG **PITTSBURGH** *Industrial* **FINISHES**
PAINTS • GLASS • CHEMICALS • BRUSHES • PLASTICS
PITTSBURGH PLATE GLASS COMPANY

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Cummins® Custom-built Diesels

Built not once but Twice

Best buy in power is the engine that's built best

Cummins Diesels have an outstanding record *and* reputation in a wide range of Diesel applications. And here's one reason!

Rugged, lightweight, high-speed Cummins Diesels perform better because they're built better, under strictest quality control methods. Moreover, each engine is actually built twice! After initial assembly, each engine is run in on the test block. Then it is torn down and carefully re-inspected — and after that it is re-assembled and tested *again*.

Such *extra* care in precision building . . . Cummins exclusive fuel system . . . reliable world-wide service and parts organization . . . enable Cummins users to get peak performance . . . less "down-time" and *more* rugged, dependable power.

Better contact your Cummins dealer. He has more facts to show you about making more profits.

Diesel power by CUMMINS

CUMMINS Dependable DIESEL

TRADEMARK REG. U.S. PAT. OFF.

CUMMINS ENGINE COMPANY, INC. • COLUMBUS, IND.

EXPORT: CUMMINS DIESEL EXPORT CORPORATION
Columbus, Indiana, U. S. A. • Cable: Cumdiex

Lightweight High-speed Diesel Engines (50-550 hp) for: On-highway trucks • off-highway trucks • buses • tractors • earth-movers • shovels • cranes • industrial locomotives • air compressors logging yarders and loaders • drilling rigs • centrifugal pumps generator sets and power units • work boats and pleasure craft.

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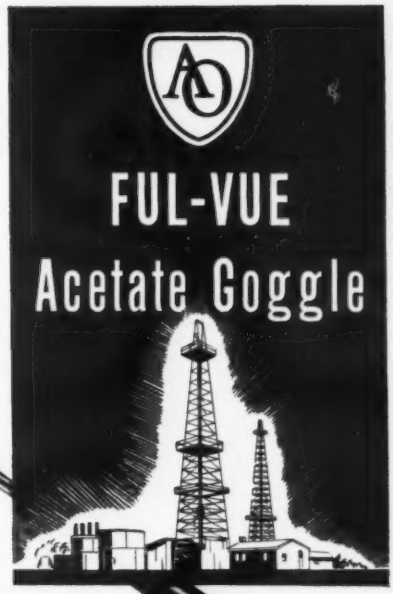
HERE'S THE Impact-Resistant, Glare-Resistant GOGGLE FOR DRILLING AND OIL FIELD WORK!



Lightweight . . . gook looking . . . strong and durable, the AO F9245G and F9249G Goggles protect oil field men equally well against flying particles and glare. This model of green acetate fits larger faces comfortably and comes with side shields. In safety, fit, comfort and appearance, you can't buy better eye protection for any money! 45 mm., 47 mm. eye sizes. 5 bridge sizes. Your nearest AO Safety Products Representative can supply you.

QUICK FACTS

UNOBSTRUCTED VISION—End pieces are out of wearer's line of sight.

STURDY BRIDGE—Strong but lightweight for comfort.

COMFORTABLE NOSE PADS—Hold goggle firmly, distribute goggle weight broadly for maximum nose comfort.

TEMPLES—"Comfort cable" or "skull" types. Former have metal core for easy adjustment, are enclosed and sealed to prevent corrosion. Latter have extra strong wire core encased in acetate and adjust easily and *stay* adjusted.

SIDE SHIELDS—Provide protection against particles striking from the side. Perforations in the acetate give good ventilation, help prevent fogged lenses.

LENSES—Shaped to conform to orbit of eye for maximum vision. 6 Curve Super Armorplate lenses in medium, dark or extra dark Calobar shades—also clear, if desired. The goggle may be fitted with Super Armorplate lenses accurately ground to the worker's own prescription.

American Optical
COMPANY
SAFETY PRODUCTS DIVISION

SOUTHBRIDGE, MASSACHUSETTS • BRANCHES IN PRINCIPAL CITIES

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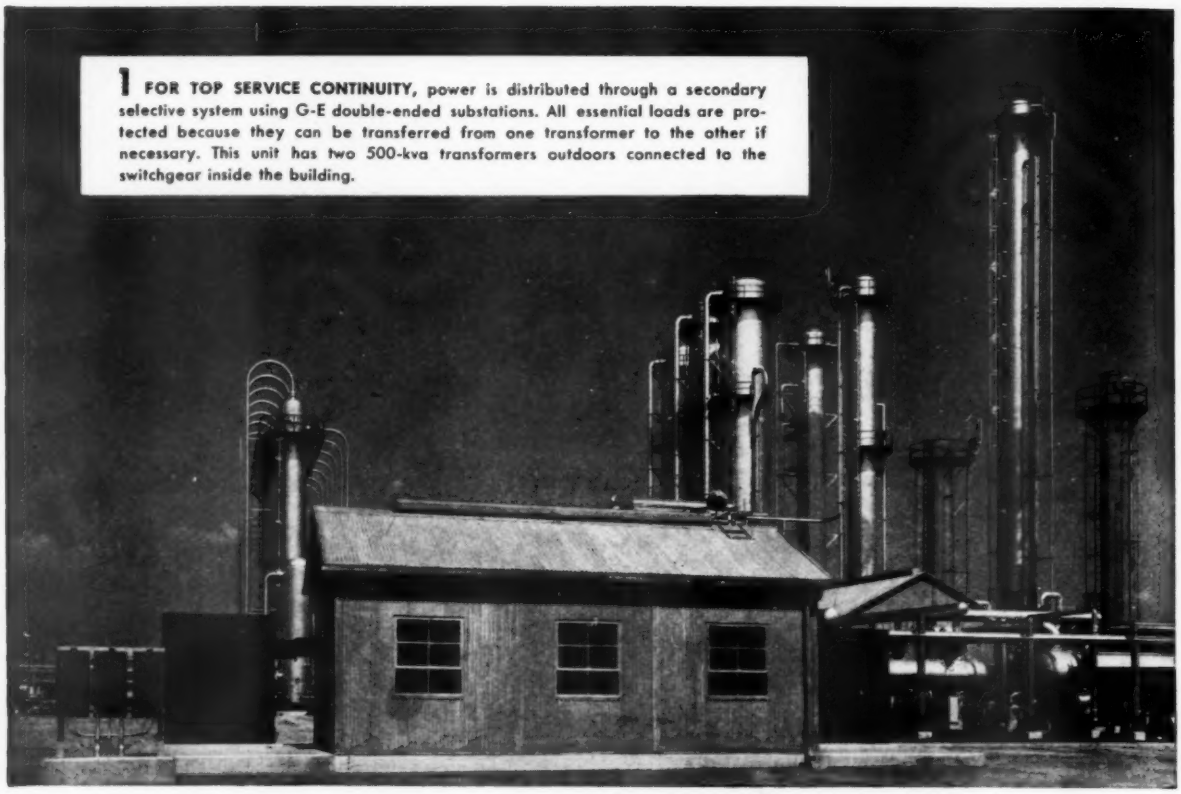

1 FOR TOP SERVICE CONTINUITY, power is distributed through a secondary selective system using G-E double-ended substations. All essential loads are protected because they can be transferred from one transformer to the other if necessary. This unit has two 500-kva transformers outdoors connected to the switchgear inside the building.

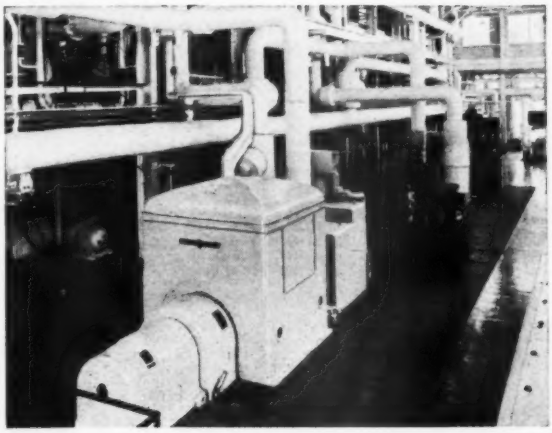
Gas cycling plant protects its ½-billion-CFD capacity!

Uses General Electric equipment—including double-ended unit substations in secondary selective arrangement—to maintain high service continuity

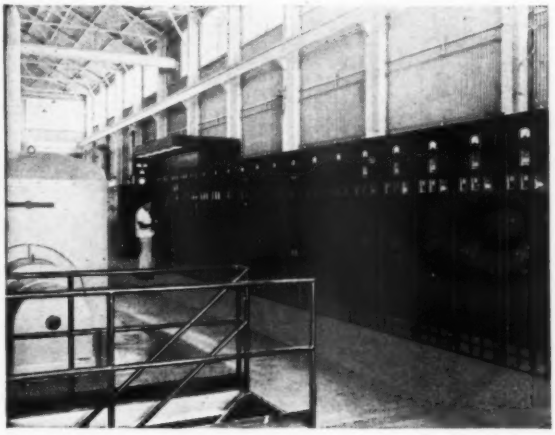
Stripping condensible by-products from "wet" gas, compressing it as "dry" natural gas, and injecting it back into the production formation, calls for power-system reliability—especially when it's done at a rate of 500 million cubic feet per day! To help safeguard production continuity in key areas at this large Gulf Coast cycling plant near Katy, Texas, reliable General Electric equipment is used. It will pay you to look to General Electric for all *your* refinery's electric equipment, plus skilled engineers to help apply it most economically. Ask your local G-E representative for the full story—soon. *Apparatus Dept., General Electric Company, Schenectady 5, N.Y.*

GENERAL ELECTRIC

661-26



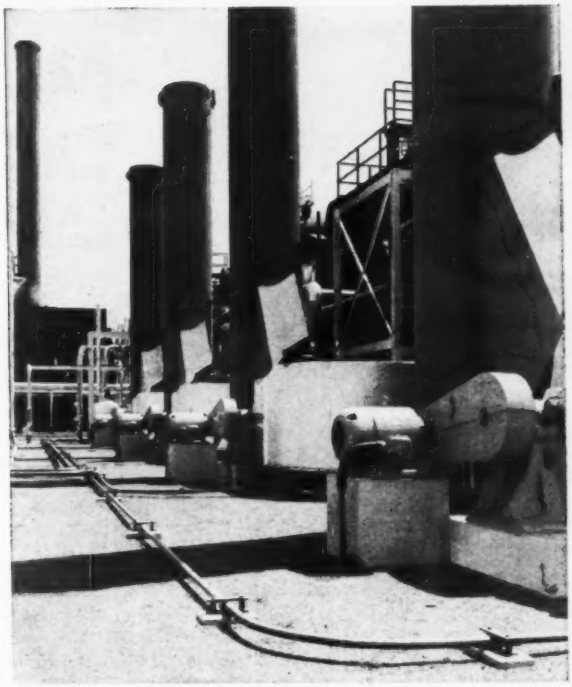
2 **DEPENDABLE POWER GENERATION** is provided by these two G-E turbine-generator sets, each rated 2500 kw, 4160 volts, with top-mounted generator coolers. The 6-stage turbines are rated 600 psig, 700 degrees F, 265 psig back pressure. G-E turbine-generators, designed for reliable operation, give maximum output per dollar of fuel cost.



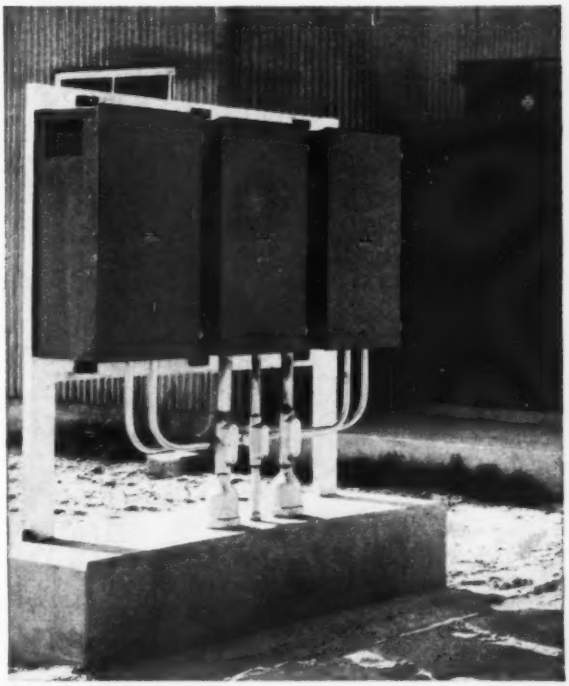
3 **COMPLETE CONTROL** of plant-generated power is supplied by this G-E 4160-volt metal-clad switchgear. Deadfront metal enclosures protect operating personnel. Circuit breakers—of adequate interrupting capacity for the plant's needs—are easily removable to simplify maintenance. Units are shipped assembled, ready for easy installation.

*Reg. Trade-mark of General Electric Co.

Co-ordinated ELECTRIC EQUIPMENT for Gas Cycling and Repressuring



4 **3-WAY EXTRA PROTECTION** against physical damage, electrical breakdown, and operating wear and tear is built into these four G-E Tri-Clad* totally enclosed fan-cooled motors driving outdoor boiler fans in the Katy plant. Rated 75 hp, 440 volts, 1200 rpm, they have corrosion-resistant cast-iron enclosures to withstand acids, alkalis and solvents.



5 **TO PREVENT CORROSION** of piping, G-E rectifiers are used for cathodic protection. Giving longer life, lower maintenance costs, and reduced shutdown time, G-E selenium rectifiers incorporate corrosion-resistant, oil-immersed stacks which are hermetically sealed against contamination by moisture or fumes in the air.

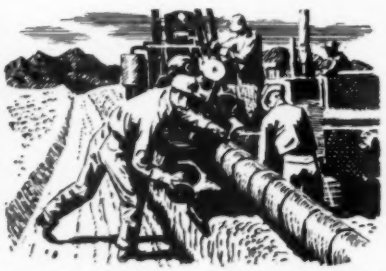
"Why should you be in all parts of the oil business?"

Mrs. Henry Lincoln, housewife in Boise, Idaho, asks: *"Do you have to be in all parts of the oil business? Why don't you just produce or refine, and give other companies a chance to do the transporting, selling, etc.?"* Mrs. Henry Lincoln

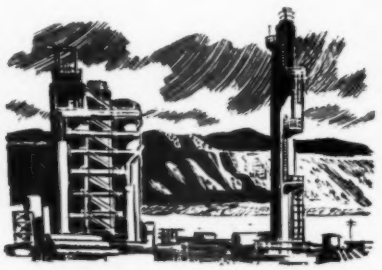
Why *all* parts? Take the example of how Standard serves Idaho and eastern Oregon. Time was when severe winter weather often delayed deliveries. Costs seemed high. Here was a *need*, a *demand*.

Some 600 miles away in Colorado was a possible source of additional fuel—the old Rangely oil field, long undeveloped. Standard studied the *demand* and the *supply*, decided to bring them together.

That called for a complete, *integrated* operation—getting the crude out of the ground, refining it, delivering it to users—all carefully planned ahead. So new wells were drilled at Rangely.

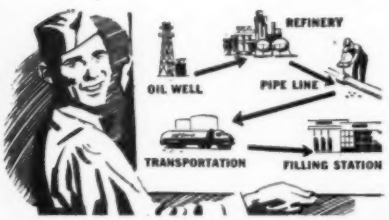


And to move the crude. Standard laid a pipeline to Salt Lake City. This called for an especially big investment because the 182 mile long line is the world's highest: crosses the Uinta Mts. at 9560 feet.



Next—a new Standard refinery at Salt Lake City. It cost over $15 million. But to keep costs down, it must operate continuously—have constant supply of crude, constant movement of product.

Another long pipeline was then built on up to the Northwest. Gasoline and fuel oil made from Rangely crude now go where they're needed—lower in cost, plentiful no matter how tough the winter.



If Standard had not been prepared—in *size*, in *integrated skills*, in *investment capital*—to tackle this job as it did, it could not have done this job at all. As it is, we are able to serve a large area *well*.

I'd Like to Know . . .

You may have heard that a suit has been filed by the Antitrust Division in Washington, D. C. to break up Standard of California as well as six other West Coast oil companies. Many people have written us protesting this action, have asked pertinent questions. We believe these questions should be answered for everyone. We take this way of doing so. If you have a question, write:

"I'd Like to Know"
225 Bush Street, San Francisco 20

STANDARD OIL COMPANY OF CALIFORNIA

• plans ahead to serve you better

The photo above is another of a series of factual stories of how the Petroleum Industry is benefited by LOW COST Purchased Electric Power.

Automatic Control releases manpower and cuts payroll costs. *PEP works 24 hours a day or operates on any fractional time schedule — this means you pay only for power used. Now is the time — in '51 — to get the job done with LOW COST Purchased Electric Power!

*PEP — Purchased Electric Power

Petroleum Electric Power Association

ORGANIZED IN THE INTEREST OF GREATER SERVICE TO THE PETROLEUM INDUSTRY

CALL YOUR NEAREST ELECTRIC SERVICE COMPANY FOR MORE FACTS

THEY GO TO BAT FOR YOU!

GENERAL PURPOSE

800* Hancock Gate

STEEL WELDVALVES

Star performance is what you get when you invest in Hancock Steel Gate Weldvalves. Here are several big reasons:

1. **Integral Stellite Seats** are trouble-free—hard, permanent, corrosion and wear resistant for extra long-life tightness.
2. **No Bonnet Joint** to cause leaks and gasket troubles. Lagging costs minimized—insulation can be run to the edge of the stuffing box.
3. **Dissimilar Materials In Seats and Wedge** assure long life—no galling! Wedge is "500 Brinell" stainless steel. Both wedge and Stellite seats are accurately finished and aligned for perfect tightness.
4. **Self-Storing Gland** is between the gland nuts — allows plenty of space along the stem to get at the packing, if necessary.
5. **Corrosion Resistant Back Seating** permits stuffing box shut-off around the stem when the valve is fully open. Repacking under pressure is safe!
6. **Yoke Post and Gland Nut Threads Protected** permanently regardless of corrosive atmospheres! Nut length is greater than its maximum travel—a number of yoke post stud threads are always covered, always workable.
7. **Ball Bearing Stem-To-Wedge Connection** distributes the load evenly, reduces frictional wear, makes operation easy.
8. **Packing is Easy.** There's plenty of space, and packing work is minimized because only the highest quality packing for the widest range of services goes into Hancock Valves.
9. **Interchangeable Parts.** Exact uniformity of all wedges, stems and thread bushings saves time, trouble, money.

Hancock General Purpose Steel Gate Weldvalves incorporate nearly 75 years of experience in valve engineering and manufacture. That's why they have design and operating features found in no other valve. Although Hancock Valves cost no more than ordinary valves, you can depend on them for month-after-month tightness in the most severe service.

See Your Nearby Hancock Valve Distributor. Tell him of your needs. You'll get prompt, efficient service.

When Hancocks go in, valve costs go down.

1877 HANCOCK U.S.A.

HANCOCK VALVES

A product of **MANNING, MAXWELL & MOORE, INC.** WATERTOWN 72, MASSACHUSETTS

MAKERS OF 'HANCOCK' VALVES, 'ASHCROFT' GAUGES, 'CONSOLIDATED' SAFETY AND RELIEF VALVES, 'AMERICAN' INDUSTRIAL AND 'MICROSEN' ELECTRICAL INSTRUMENTS. BUILDERS OF "SHAW-BOX" CRANES, 'BUDGIT' AND 'LOAD LIFTER' HOISTS AND OTHER LIFTING SPECIALTIES.

XUM

Wherever You Are...

RECTORHEAD

RECTOR FULBORE CEMENTING METHOD

RECTORSEAL

ARE CLOSE AT HAND...

Arrow Supply Company
American Pipe & Supply Co.
Beacon Supply Company
Bethlehem Supply Company
Bovaird Supply Company
Continental Supply Company
C. W. Cotton Supply Company
Dunigan Tool & Supply Co.
Ft. Worth Pipe & Supply Co.
Franklin Supply Company
Houston Oil Field Material Co.
Industrial Supply Company
Iverson Supply Company
Jarecki-International Supply Co.
Jones & Laughlin Supply Co.
Lamtex Equipment Corporation
Louisiana Supply Company
Lucey Products Corporation
Mid-Continent Supply Company
Midland Supply Co., Inc.
Murray-Brooks, Inc.
National Supply Company
Norvell-Wilder Supply Co.
Oil Well Supply Company
Pelican Well Tool & Supply Co.
Producers Supply & Tool Co.
Republic Supply Company
Rocky Mountain Supply Co., Ltd.
Rodman Supply Company
Standard Supply & Hdw. Co.
Superior Iron Wks. & Supply Co.
Union Supply Company, Inc.
United Supply & Mfg. Company
Western Oil Tool Company
Wilson Supply Company

North, South, East and West . . . wherever there's oil activity there's a SUPPLY STORE ready to meet your needs for dependable, safe drilling, completion and production with RECTORHEADS . . . for master cementing jobs with the RECTOR "FULBORE" CEMENTING METHOD . . .for permanently leak-proof connections with RECTORSEAL.

"Making the oil industry safer" has been a Rector policy since the first Rectorhead was installed more than 20 years ago. "Serving the oil industry better" is the continuing program of supply stores everywhere. Together, Rector equipment and SUPPLY STORE service are working for your best interest for more efficient, economical, safe drilling and production.

This progressive manufacturing and service policy gives you the advantage of having Rectorheads, Rector "Fulbore" Cementing Equipment, Rectorseal and other Rector Products available from 35 supply companies operating throughout the United States and Canada.

RECTOR

RECTOR WELL EQUIPMENT COMPANY INC

★ MAKING THE OIL INDUSTRY SAFER ★

ASSOCIATION OF WELL HEAD EQUIPMENT MANUFACTURERS CERTIFIED

1100 NORTH COMMERCE ST. FORT WORTH, TEXAS

Houston Plant: 2215 Commerce St.

REPRESENTATIVES IN ALL ACTIVE FIELDS

SOUTH AMERICA: W. C. Langley, Air Mail: Apartado Aereo 397; Boat Mail: Apartado 838, Barranquilla, Colombia, South America; New York City, U.S.A., 233 Broadway. CANADA: Geo. S. Badger, 8035 102nd St., P. O. Box 565, Edmonton, Alberta, Canada.

XUM

ALL ROPES *look* ALIKE... but

IN *Wickwire Rope*

TESTING GOES

Precision polishing and high powered magnification enable us to go 100 times beyond normal vision in examining Wickwire Rope steel for classification of grain size to McQuaid-Ehn* standards.

100 times beyond normal vision

Uniformity of grain size in steel assures longer life and greater reliability in Wickwire Rope.

Right down the line...starting with the melting and refining of our steel ...and continuing through heat treating processes and cold drawing of the wire, we maintain complete control over the grain size of steel used in Wickwire Rope.

This quality control of basic properties is possible only with a company whose operations are fully integrated from the actual making of the steel to the stranding of the finished rope. It's just one more example of how Wickwire goes "beyond specifications" to give you—at market prices—wire rope that is unsurpassed for reliability, safety and longer life.

See your local Wickwire distributor for the right rope for your particular requirements. Wickwire Rope is available in all sizes and constructions, both regular lay and WISSCOLAY *Pre*formed.

*For detailed information on the McQuaid-Ehn test and what it means to you in superior rope performance, write to Wire Rope Sales Office, Wickwire Spencer Steel Division of C. F. & I., Palmer, Mass.

WICKWIRE ROPE [CF&I]

A PRODUCT OF THE WICKWIRE SPENCER STEEL DIVISION OF THE COLORADO FUEL AND IRON CORPORATION

WIRE ROPE SALES OFFICE AND PLANT—Palmer, Mass. **EXECUTIVE OFFICE**—500 Fifth Avenue, New York 18, N. Y.

SALES OFFICES—Abilene (Tex.) • Boston • Buffalo • Casper • Chattanooga • Chicago • Denver • Detroit • Emlenton (Pa.) • Houston • New York Odessa (Tex.) • Philadelphia • Phoenix • Salt Lake City • Tulsa

PACIFIC COAST SUBSIDIARY—The California Wire Cloth Corporation, Oakland 6, California

XUM

INSURE LONG LIFE FOR YOUR PRODUCTION EQUIPMENT

KONTOL Corrosion Inhibitors mix with the well fluids and adsorb to the surfaces of sucker-rods, casing, tubing, pumps, et cetera. This adsorbed Kontol film is impervious to the action of corrosive elements, greatly increasing the useful life of steel production equipment. Not only is hard-to-get steel conserved, but wells are produced more cheaply because of savings in down-time and costly pulling jobs. Kontol Corrosion Inhibitors are economical to buy, easy to use, safe to handle. If your wells are down frequently because of mechanical failures, corrosion may be the cause. For complete information on Kontol and the savings it will bring you, call your Tretolite Company service engineer.

KONTOL

CORROSION INHIBITOR

protects **SUCKER RODS**
TUBING
CASING
PUMPS
FLOW LINES

a product of the **TRETOLITE COMPANY**

Chemicals for the Petroleum Industry

ST. LOUIS 19, MISSOURI • LOS ANGELES 22, CALIF.

CORROSION INHIBITION · DEHYDRATING · DESALTING
SCALE PREVENTION · WATER DE-OILING · PARAFFIN REMOVAL

K 51-1

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THE INDUCTION LOG

...in OIL BASE MUDS or in CABLE TOOL HOLES where no mud column exists

In 1831 Faraday made one of the most important electrical experiments in history when he discovered the operation of the induction coil. The ignition systems of our modern automobiles remake this Faraday experiment for us countless times each day.

In 1855 Maxwell developed the mathematical equations for the Faraday induction coil experiments and, as a result, the electromagnetic wave theory was born. In less than 100 years man has harnessed electromagnetic wave transmission in many ways. The wireless telegraph was developed into the radio. After radio came radar and television.

In 1946 Schlumberger adapted electromagnetic wave transmission to earth measurements for the first time by means of the Induction Log. The development was undertaken in order to obtain precise electrical measurements in oil base muds, or in cable tool holes which have no mud column. Conventional resistivity curves are difficult and sometimes impossible to obtain under such conditions because electrical contact with the formation is uncertain.

If you are faced with the problem of obtaining a satisfactory survey in either oil base mud or a well drilled with cable tools, call your Schlumberger Engineer for further information.

SCHLUMBERGER

The Induction Log, first introduced by Schlumberger, is a result of Schlumberger's progressive program of research and engineering to provide advanced services to the oil industry.

SCHLUMBERGER WELL SURVEYING CORPORATION • HOUSTON

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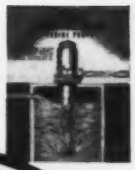
ALL THE CAPACITY
ALL THE VERSATILITY
ALL THE POWER
ALL THE EFFICIENCY

OF A DEEP WELL PUMP FOR SHORT OR MEDIUM SETTINGS

REQUEST FREE BULLETIN
Describing and illustrating Peerless close-coupled pumps. Request Bulletin B-159.



PEERLESS PUMPS

PEERLESS *Close-Coupled* VERTICAL TURBINE PUMPS

CHARACTERISTICS AT A GLANCE:

HEADS
Up to 1000 feet

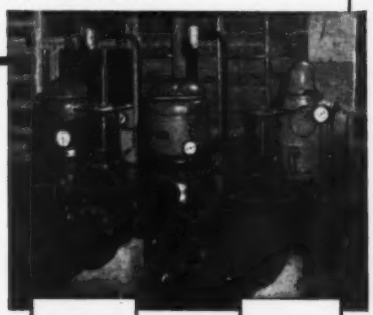
CAPACITIES
Up to 30,000 g.p.m.

H.P. RANGE
Up to 2,500 h.p.

DRIVES
As required; standard electric vertical hollowshaft or solid shaft motors; right angle gear drive; V- or flat belt; combination units.

LUBRICATION
Choice of oil or water lubrication.

NO PRIMING PROBLEMS



INDOORS OR OUTDOORS | **LARGE OR SMALL**

SPACE SAVING VERTICAL PUMP FOR BASINS, SUMPS, RESERVOIRS AND SURFACE WATER SOURCES SUCH AS RIVERS, LAKES, PONDS

This successful, close-coupled, modification of the Peerless vertical deep well turbine pump, for industrial processes, embodies all the outstanding design and performance characteristics which have made Peerless the leader in the sale of vertical, deep well turbine pumps. Peerless vertical close-coupled turbine pumps are economically applied to a widest range of municipal, industrial and commercial water lifting or boosting and circulation processes, where short or medium pump settings are involved. Plan with Peerless to get the power, capacity and utility of this vertical space-saving pump that will cut your pump overhead with measurable savings. Descriptive Bulletin No. B-159 describes and illustrates its design, performance and applications, write for it today.

PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION
Address Inquiries to Factories at:
Los Angeles 31, California or Indianapolis 8, Indiana.
Offices: New York, Atlanta, Fresno, Los Angeles, Chicago, St. Louis, Phoenix; Dallas, Plainview, Lubbock, Texas; Albuquerque, New Mexico.

2 DIFFERENT TYPES OF "Buffalo" FANS
—AND WHERE EACH GIVES BEST SERVICE

"Buffalo" AXIAL FLOW FANS

High efficiency on straight-line air delivery (no curved connections near inlet or outlet) . . . high velocity . . . moderate system pressure . . . are factors in choosing "Buffalo" Axial Flow Fans. Their compact design, too, makes them ideal where installation space is short. However, where system pressure is high, there is a sacrifice in efficiency, and a "Buffalo" centrifugal fan would be a better choice. Generally, "Buffalo" Axial Flows are lighter, more compact and cheaper to install than centrifugal fans.

"Buffalo" "LL" FANS

Here are the centrifugal fans used throughout industry for large-scale ventilation, exhaust and as air conditioning supply fans. They are designed to deliver against higher system pressures than Axial Flows, though both fans are non-overloading. "Buffalo" Type "LL" Fans retain their high efficiencies even when installed near curved duct connections. These fans may be had in direct or belted drive, almost any discharge position, and sizes up to 500,000 cfm.

Write For These Helpful Bulletins!

Bulletin 3533-C gives all construction data and a comparison performance characteristic curve of "Buffalo" Axials and "LL" Fans. WRITE TODAY!

Bulletin 3737, right, is the newest bulletin on the famous "LL" Fans, full of applicable facts on solving your ventilation problem.

"Buffalo" FIRST FOR FANS

BUFFALO FORGE COMPANY

525 BROADWAY — BUFFALO, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. — Branch offices in all Principal Cities

VENTILATING FORCED DRAFT | AIR WASHING COOLING | AIR TEMPERING HEATING | INDUCED DRAFT EXHAUSTING PRESSURE BLOWING

XUM

COST WHEN MADE FROM FORGINGS—$1.714
Cost of forging per unit. $0.4228
Production cost per unit (broached and then machined on chucking automatic). $1.2912
TOTAL COST PER UNIT— $1.714
COST WHEN MADE FROM TIMKEN TUBING—$1.47
Cost of tubing per unit. $0.293
Production cost per unit (with mill-length tubing on 4-spindle 5" capacity automatic screw machine) . .$1.177
TOTAL COST PER UNIT— $1.47

Why this sleeve costs only $1.47 instead of $1.71

WHEN made from forgings, this part cost $1.71 per piece. By switching to Timken® seamless tubing, the manufacturer was able to cut his cost down to $1.47 per piece. Here's why this saving was possible: 1. Unit for unit, Timken seamless tubing was far less expensive than forgings. 2. The mill lengths of tubing could be broached and machined on an automatic screw machine, whereas the forgings had to be broached and then machined on a chucking automatic. Actual cost figures are shown above.

Timken tubing also offers cost advantages over bar stock, as well as forgings. With tubing you can often start right in with finish boring. The center hole is already there. Metal is conserved. Scrap loss is reduced —machining time saved.

And you get better quality too. Timken tubing gives you fine forged quality that's always uniform from tube to tube and heat to heat. For help in choosing the most economical tube size for your job, use our Tube Engineering Service. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO."

YEARS AHEAD—THROUGH EXPERIENCE AND RESEARCH

Specialists in alloy steel—including hot rolled and cold finished alloy steel bars—a complete range of stainless, graphitic and standard tool analyses—and alloy and stainless seamless steel tubing

XUM

When Choosing V-Belts Remember These Two Words ...They Mean Exactly What They Say!

"DEPENDABLE RUGGEDNESS" didn't get into the BWH trade mark by accident. It means *precisely* what it says . . . Bull Dog V-Belts assure steady, smooth, low cost power transmission — *uninterrupted by premature belt failure.* You save on maintenance costs, keep the wheels of power moving!

TOUGH PROBLEMS INVITED — Ask us or your nearest BWH distributor about your power transmission belting, conveyor belting and hose problems. We're specialists in making mechanical rubber products work *better, longer.*

- **SPECIALLY ENGINEERED BWH CORD SECTION**
  Noted for high tensile strength. *Benefit:* superior load carrying capacity, ability to absorb shock loads, uniform matching when used in sets.
- **MINIMUM STRETCH**
  Results from a new, exclusive technique in processing Bull Dog Cords. *Benefit:* reduced slippage, a minimum of adjustments, longer belt life.
- **DURABLE COVERS**
  The secret's in the closeness of weave of the heavy, bias cut fabric. *Benefit:* it can take the severe wearing action of the sheave while sealing the belt against moisture, dirt and grease.
- **WITHSTANDS SEVEREST FLEXING**
  The "reason why" here is due to constant research in the development of quality - controlled compounds by BWH. *Benefit:* these compounds run cooler and do not crack or deteriorate under severe flexing.

For these reasons make your next V-Belt purchase order read "Bull Dogs" — and buy them by the set!

The HAPPY COMPANY
Formerly HAPPY BELTING COMPANY
TULSA, OKLAHOMA

Branch Offices
Seminole, Okla.
Smackover, Ark.
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Industrial Hose Rubber Belting V-Belt Sheaves
V-Belts Power Transmission Equipment

Another Quality Product of

BOSTON WOVEN HOSE & RUBBER COMPANY

Distributors in all Principal Cities

PLANT: CAMBRIDGE, MASS. • P. O. BOX 1071, BOSTON 3, MASS., U. S. A.

New WHELAND HP-14000 7½" x 14" Duplex Slush Pump

STEEL OR SEMI-STEEL FLUID END OPTIONAL

350 Horsepower

...AND ALL THE HORSES ARE THERE!

WHELAND TIE RODS. Maximum strength, minimum weight. Tie rods for extra strength are used by leading manufacturers of heavy-duty equipment such as big hydraulic and mechanical presses for forging, stamping, bulldozing. No better method has ever been found to get strength where it is most needed. Wheland uses tie rods because it is the BEST WAY to get EXTRA strength into a pump. You may have seen a lot of pumps broken in the cradle . . . but YOU NEVER SAW A WHELAND TIE ROD PUMP WHICH BROKE AT THE CRADLE.

From discharge pressure of 838 lbs. with 7½" liners to 1627 lbs. with 5½" liners at 60 R.P.M., here is the pump that delivers the mud. Wheland's exclusive power end has the strength to do the job. The fluid end, available in steel or semi-steel, is one of the best liked, best proved designs ever offered the oil driller.

This new Wheland pump is packed with features that mean extra strength, extra smoothness, more accessibility, more flexibility and great DEPENDABILITY. It's your best buy in pumps! Write for bulletin

THE BEST POWER END EVER BUILT

The crank is the guts of any pump and here is the outstanding development . . . EXCLUSIVE WITH WHELAND. Assembled as an integral unit with NO CONNECTING ROD BOLTS. One-piece alloy steel crank on Timken Roller Bearings. Heat treated alloy steel connecting rods fitted to crank on American Roller Bearings. Tool steel helical gear and pinion, specially hardened. Ample size. Ample strength. Quiet. Free of vibration. This WHELAND pump really has the guts to do the job!

MEMBER
PETROLEUM EQUIPMENT
SUPPLIERS ASSOCIATION

WHELAND

THE WHELAND COMPANY, CHATTANOOGA, TENN., U. S. A.
ROTARY DRILLING MACHINERY

DRAWWORKS • SLUSH PUMPS
ROTARIES • CROWN BLOCKS
TRAVELING BLOCKS • SWIVELS

DOMESTIC DISTRIBUTORS & THEIR HEADQUARTERS: Jones & Laughlin Supply Co., Tulsa, Oklahoma • Houston Oil Field Material Co., Inc., Houston, Texas
Iverson Supply Co., Tulsa, Oklahoma • Lucey Products Corporation, Tulsa, Oklahoma • Superior Iron Works & Supply Co., Inc., Shreveport, Louisiana
EXPORT DISTRIBUTOR: Lucey Export Corporation, 233 Broadway, New York 7, New York — Broad Street House, London E. C. 2, England

Why the FIRST names in pipelines depend on the FIRST* name in line pipe

*FIRSTS by A. O. SMITH • Welded line pipe • Internal expanded pipe • Light wall large diameter pipe • World's largest producer of large diameter welded steel line pipe

"Straight as a die" can be taken literally when oil men discuss A. O. Smith Line Pipe. That's because A.O. Smith's internal expanding process stresses the pipe beyond its yield point—and when pipe is stressed beyond its yield point by uniform internal expansion it automatically comes out round, straight, and consistently of the right diameter.

Uniformly round, straight pipe eliminates time-consuming "line-up" operations in the field and makes possible consistent "stringer bead" welds.

In addition, the A. O. Smith expanding process produces pipe of high yield strength permitting higher operating pressures without the use of alloy steels and their accompanying special welding practices. No wonder the *first* names in pipelines depend on the *first* name in line pipe!

A. O. Smith Line Pipe is available in a complete range of sizes and wall thicknesses, from 8⅝ in. to 36 in. in diameter.

A.O. Smith 77th ANNIVERSARY 1874 - 1951

A.O.Smith

LINE PIPE • CASING

Atlanta 3 • Chicago 4 • Dallas 2 • Denver 2 • Houston 2
Los Angeles 14 • New York 17 • Pittsburgh 19 • Salt Lake City 1 • San Francisco 4 • Seattle 1
Tulsa 3 • Washington 6, D. C. • International Division: P. O. Box 2023, Milwaukee 1

DEPENDABILITY *through* **RESEARCH** *and* **ENGINEERING**

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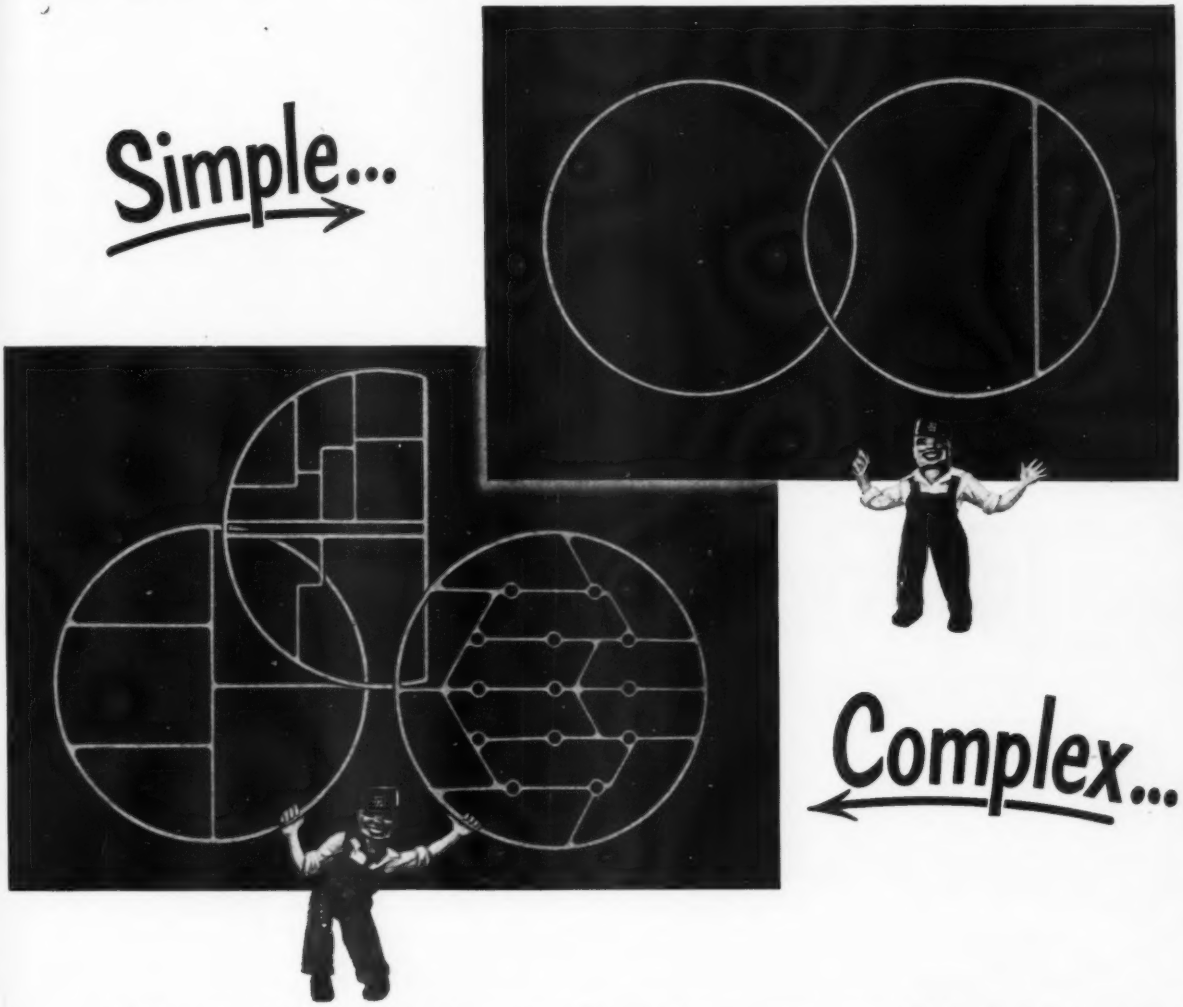
Precision-made to the design you need . . .



Goetze Heat Exchanger Gaskets stay on the job longer!

Whether your specifications call for a simple or complex design, you can depend on Johns-Manville Goetze heat exchanger gaskets to do the kind of sealing job that costs you less in the long run!

That's because they are carefully hand-tailored to assure the accuracy of fit so important in heat exchanger service. Every detail of construction reflects the craftsmanship that goes into the fabrication of these better gaskets. You'll find no wrinkles or cracks on the corners. Lap widths are ample, rib widths uniform.

More than 60 years of gasket-making experience is your further assurance that when you put a Goetze heat exchanger gasket on the job, you can count on it to *stay* on the job for a long time. For further details and a prompt estimate of cost, send us a blueprint or template. Just address Johns-Manville, Box 290, New York 16, New York.

Johns-Manville Goetze GASKETS

THERE'S A JOHNS-MANVILLE PACKING AND GASKET FOR EVERY SERVICE

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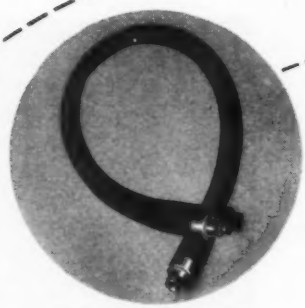
STEAM HOSE

Toss it around. Use it rough. Republic Steam Hose is built for punishment! It's easy to handle, it's safe under highest pressures; always ready for duty. All standard sizes available in lengths up to 50 ft.



ROTARY DRILL HOSE

No bolts or protrusions of any kind to catch on the rigging! Republic's Champion Rotary Drill Hose is made with the new, Patented Boltless Coupling, streamlined to the shape of the hose and locked in leakproof union by a special hydraulic seal. Built-in steel muscles protect the oil-resistant Reprene hose from distortion. There are three types of Champion Hose tested for 3000, 4000 or 5000 psi. Supplied in standard lengths up to 55 ft.

Try Republic First

FOR RUBBER PRODUCTS BUILT TO OIL FIELD SPECIFICATIONS

MUD PUMP HOSE

Flexible, smooth bore suction hose with internal, spiraled steel reinforcements and a tube and cover that'd almost take a diamond to cut!

When it comes to the rough and tumble, Republic Rubber products stand on their own feet.

That goes for hose, belting, packing . . . any and all of the many items that Republic makes especially for oil field service.

Republic Rubber products are easier to handle, they're stronger, safer and more economical. So don't delay. Get in touch with the Republic Distributor nearest you soon. He's had lots of experience matching specific products to individual jobs like yours and we're betting he can come up with the right answer for you.

INDUSTRIAL RUBBER PRODUCTS BY

REPUBLIC RUBBER DIVISION

Lee Rubber & Tire Corporation

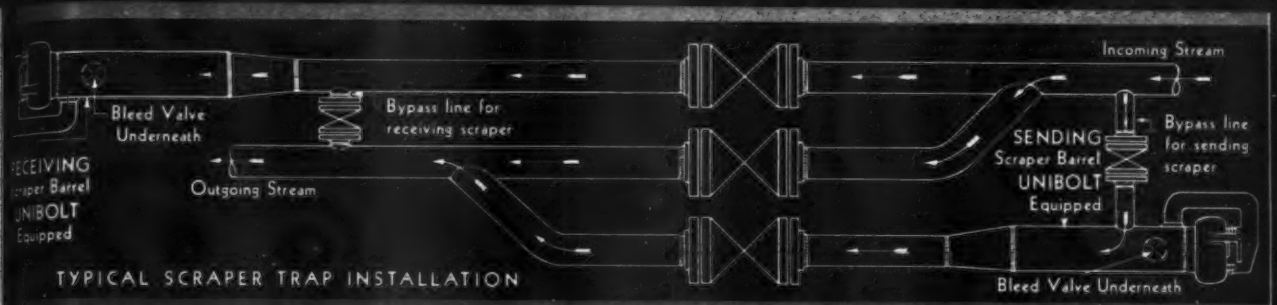
YOUNGSTOWN, OHIO

MID-CONTINENT DISTRIBUTORS

The Bovaird Supply Co., Tulsa, Okla.
Jones & Laughlin Supply Co., Tulsa, Okla.

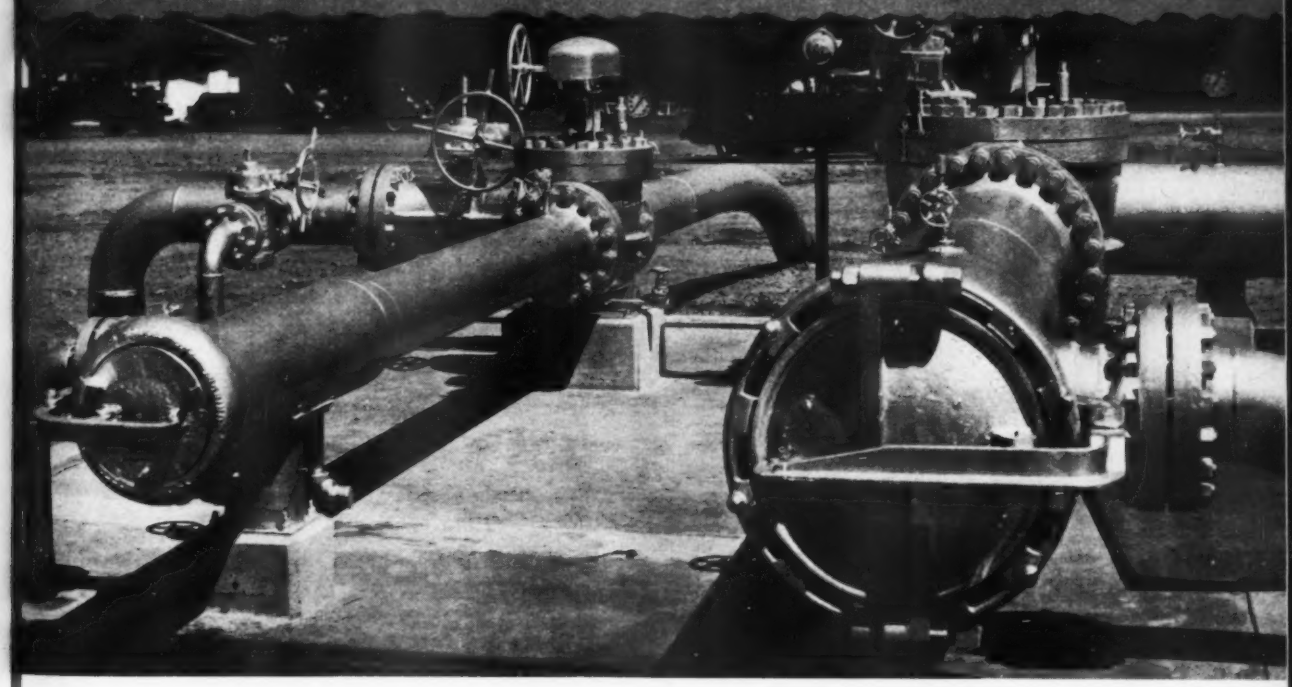
WEST COAST DISTRIBUTORS

Pacific Coast Rubber Co., 51 Main St., San Francisco, Calif.
W. C. Hendrie & Co., Inc., 405 Towne Ave., Los Angeles, Calif.



TYPICAL SCRAPER TRAP INSTALLATION

THE EASY WAY TO CATCH A PIG!



The oversize barrel does the trick. Note in the above sketch of a typical scraper trap installation how an oversize barrel on both the sending and receiving ends of the line provides ample clearance for the pig (which has the same o. d. as the pipe in which it is run). No sidebooms, tractors, rams and strongarm men required. Line pressure does the heavy work.

But that's only half of the story. To further simplify the job, all you need do to open the UNIBOLT Hinged Scraper Trap is release two bolts and the blanking plug swings open like a door. No heavy lifting. Nothing to fall on workmen. No time-consuming blind flanges to make up. No danger of leaks — the UNIBOLT self-sealing oil-resistant seal ring assures a pressure-tight seal.

UNIBOLT
SCRAPER TRAP
with oversize barrel

Wherever multi-bolt flanged couplings and closures are now being used . . . on strainers, scrubbers, mist removers, terminal manifolds, blowdowns or other pressure vessels . . . UNIBOLT Couplings will serve you better. Send for literature.

THORNHILL-CRAVER COMPANY • HOUSTON, TEXAS

PRECISION TEAMWORK WINS!

Mission Silver Top Valve for Normal Pressures

"Stroke! . . . Stroke! . . . Stroke!" barks the coxswain. The men move in exact unison. The oars flash like a single mechanism. Precision teamwork **wins!** It is the same in slush pump operation. Piston, rod, liner, packing . . . must operate in perfect alignment, have perfect fit, work together with perfect mechanical precision.

The new MISSION "Super-Service" Liner . . . accurately bored, **induction** hardened to **uniform** case thickness, precision honed, and "Satin Finished" . . . now enables you to obtain the same top quality in liners that you obtain in MISSION Pistons, Rods, Packing, and Valves.

These products constitute a perfectly mated "team" . . . insure unmatched **economy**, in slush pump operation! Your supply store handles them . . . Mission Manufacturing Co., Houston, Texas. Export: 30 Rockefeller Plaza, New York. European Address: London, England.

Mission Super-Service Valve for High Pressures

"ROLLING DOG" SLIPS
TUBING SWABS
PLUG VALVES
CENTRIFUGAL PUMPS

Silver Anniversary MISSION MANUFACTURING CO. 1951

MISSION MANUFACTURING CO.

They Say—

Tax Impact

"In addition to federal income tax of $52,000,000, Gulf Oil Corp. in 1950 incurred $39,614,000 of other federal, state, and local taxes, making the direct tax bill for the year $91,614,000. This amount does not include gasoline, lubricating oil, and other product taxes of $173,072,000, which Gulf was required to collect from its customers for various governmental authorities. In effect, therefore, the total tax bill for the year was $264,686,000, equivalent to $6,099 for each Gulf employe, or $23.33 for each share of capital stock outstanding.

"The impact of high taxation on corporate earnings is evident, and the full effect of the increasing tax burden will be more apparent in 1951 when the company must carry the load of much higher tax rates. While it is recognized that the financial position of all levels of government should be maintained in a sound condition as assurance of the basic strength of the nation, the extreme nature of the tax program indicates the dire need for a high level of efficiency in government, and a drastic curtailment of all expenditures not vitally essential to the national defense and economy."

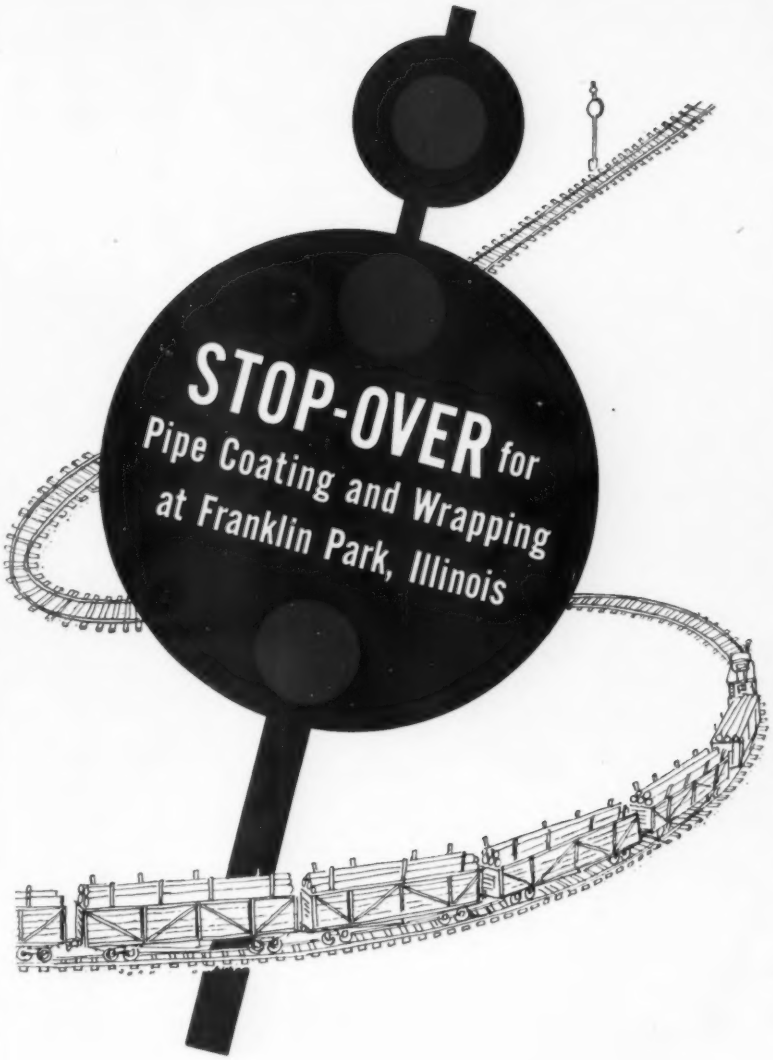
—*Gulf Oil Corp. annual report.*

The Iranian Situation

"Russia has at this time about 700,000 bbl. a day of oil production, perhaps a little in excess of that. We do not know exactly what their production is, but we do know that the shadow of that Russian Bear lies constantly over the Middle East oil fields, and we all know through the press that Iran voted unanimously in their parliament to nationalize the oil resources of that nation. Iran has 9½ billion barrels of oil, or 11 per cent of the world's reserve.

"I have been in that country, and I have seen the people. And I know full well the influence of the Russian communistic ideology on those people. They are very poor people, and ideologies are interpreted in their minds by things like a leather coat, a pair of leather boots, and a leather cap. They see the Russians with a leather cap, a leather jacket, and a pair of leather boots, and to them that means communism; and that means that under communism they will have a leather cap, a leather jacket, and a pair of leather boots, and that is all the ideology has got and those things look good to the Iran peasant.

"I wouldn't be a bit surprised if Iran did not make some kind of a trade with the Russians so that the



Pipe can be shipped from eastern mills on through rates to destinations west, northwest, and southwest with stop-over privilege at our *Franklin Park, Illinois*, plant for cleaning, priming, coating and wrapping. Over 20 acres available to store your pipe as long as one year before re-shipment.

In every way, PLS service is complete . . . thoroughly dependable.

PLS

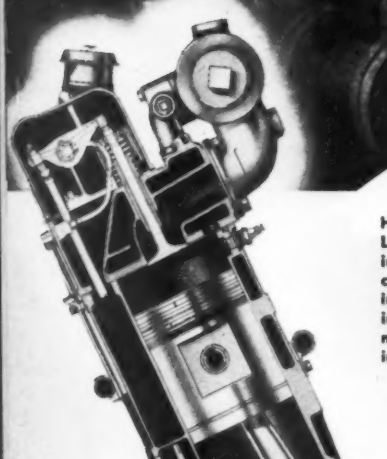
PIPE LINE SERVICE CORPORATION

Pioneers in Steel Pipe Protection

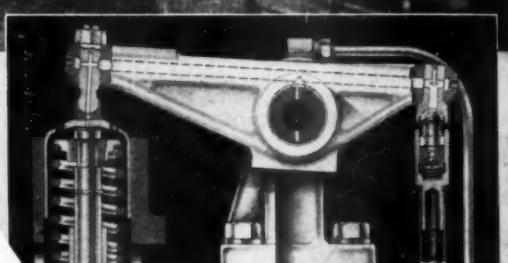
General Office and Plant • Franklin Park, Illinois

Plants at Glenwillard, Penna.; Longview, Texas; Corpus Christi, Texas; Harvey, La.; and Sparrows Point, Md.

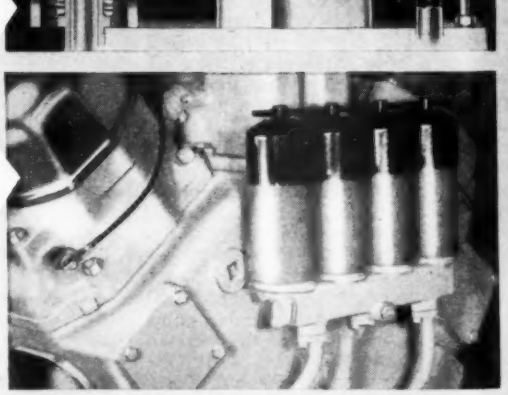
Dependable



Here's a modern pipeline installation of Le Roi 600 (max) hp L-3460 engines driving multi-stage pumps through speed increasers. Le Roi's 13 years of experience in the pipeline field was a major factor in bringing out the 600 hp L-3460 to meet the industry's need for more power in a low-cost, medium-speed engine.



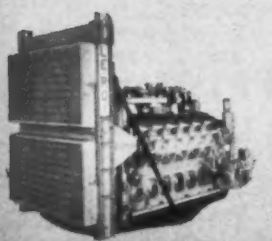
The 600 hp L-3460 is equipped with "zero-lash" hydraulic valve lifters. They eliminate tappet adjustments, increase valve life, make possible smooth, trouble-free operation.



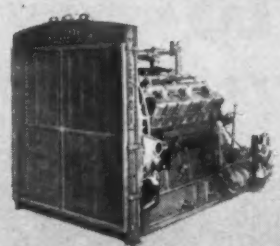
Full-flow, by-pass oil filters and coolers provide sure engine protection — still greater dependability.

Here's a cross section of an RX series engine. Note the guided valve stem mechanism and controlled water circulation around the valves that give long valve and valve-seat life. Light aluminum pistons with full-floating pins are cam-ground and tapered for precise fit, make possible faster acceleration, smoother running.

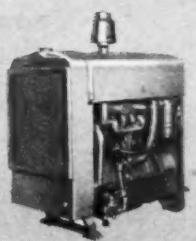
There's a Le Roi Engine for Every Oil Field Need



L-3460
HP range 280-600



RX Series
HP range 79-410



D Series and H-540
HP range 6-155

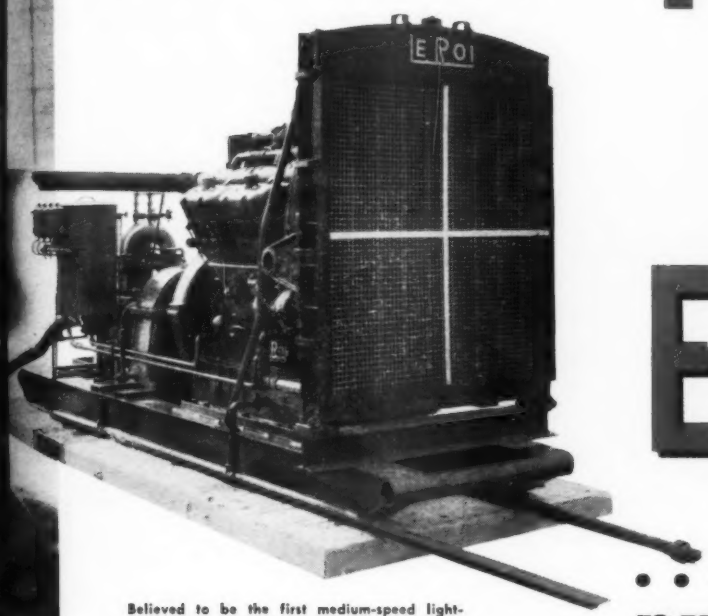
A Typical Le Roi Service Facility

Here's the efficient, well-arranged parts department of Le Roi-Rix Co.'s Long Beach branch. Two more offices — at Bakersfield and Los Angeles — are similarly equipped. All three offices maintain prompt 24-hour service. Le Roi has service facilities like these throughout the oil fields — another reason why you can depend on Le Roi.

ow-cost power—

Le Roi Engines

. . . for pipeline pumping service



Believed to be the first medium-speed lightweight engine applied to pipeline service, this Le Roi V-8 still operates dependably and efficiently in a major pipeline station at Placido, Texas.

Medium-speed, lightweight Le Roi engines save money on initial investment, and maintenance

An interesting trend was started in 1938, when the Engineering Department of a major oil company decided to use medium-speed, lightweight Le Roi engines in place of conventional, slow-speed, heavyweight units on a main pipeline installation.

The choice of Le Roi was fully justified. The horsepower per dollar cost was lower. The engines were easier to service — service parts more easily obtained. And performance proved to be dependable and economical. Repeat orders followed until the pipeline project was 100% powered by Le Roi. All ten units are still giving good service.

As news of this successful installation spread Le Roi's popularity for pipeline service grew — and an ever-increasing number of Le Roi installations are being made in other fields. Yes, they're swinging to Le Roi — because Le Roi dependability and low-cost maintenance keep operating expenses to a minimum. Moreover, Le Roi engines are backed by complete service facilities in every active area.

No matter what your engine application is, it pays you to call on your nearby Le Roi distributor. He can show you Le Roi engines at work under conditions similar to yours. See why Le Roi *leads the field — in the field.*

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Plants: Milwaukee • Cleveland • Greenwich, Ohio — Oilfield Headquarters: Tulsa, Oklahoma

P-108

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Carson Machine & Supply Co.— Oklahoma City

East & South Texas, Gulf Coast
Southern Engine and Pump Company — Houston, Kilgore, Edinburg, Dallas, San Antonio, Corpus Christi, Texas, and Lafayette, Houma, Louisiana.

North & West Texas, New Mexico
General Machine & Supply So. — Odessa, Snyder, Texas.
Nortex Engine & Equipment Co.—Wichita Falls, Texas.

Kansas
Carson Machine and Supply Co.—Great Bend

Illinois — Western Kentucky
Western Machinery & Engine Company—

LE ROI

IN THE FIELD . . .

Service Network

Michigan
Hafer Engine Service — Reed City

Rocky Mountain Area
Gehring Equipment Co. — Casper, Wyoming, Rangeley, Col.

Northern Louisiana & Mississippi
Ingersoll Corporation — Shreveport, Louisiana, and Jackson, Mississippi.

West Coast
Le Roi-Rix Machinery Co. — Los Angeles, Long Beach and Bakersfield, Calif.

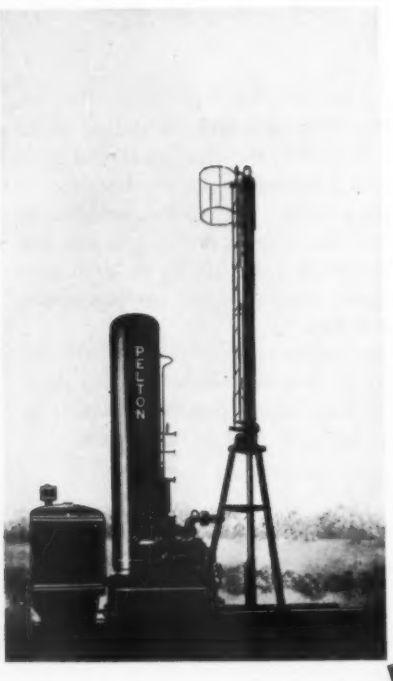
Appalachian Area
P. C. McKenzie Co., Pittsburgh, Bradford.

Canada
Lucey Export Ltd. — Calgary, Edmonton,

A new Pelton

series D
10 ft. stroke
polished rod load rating 20,000 lb.

hydraulic pumping jack
for heavier production in shallower fields



With a 10 ft. surface stroke and a 20,000 lb. polished rod load rating, this new small PELTON Series "D" Hydraulic Pumping Jack enables an operator to benefit from all the advantages of Long Stroke Hydraulic Pumping at a cost competitive with conventional units of much shorter stroke.

The new 10 ft. "D" Jack retains all of PELTON'S exclusive features including triple screw positive displacement pump and full hydraulic reversing controls.

PELTON'S constant velocity stroke together with fewer and softer rod reversals guarantee longer life for sucker rods and bottom-hole equipment. Field records show oil production has been doubled and rod breakage reduced well over 50%.

For simplicity and ease of operation — for high production at low cost — and for the most modern pumping method in the field today, insist on Long Stroke Hydraulic Pumping Jacks as built by PELTON — engineers in Hydraulics for 70 years.

PELTON long stroke hydraulic pumping jack

The complete line of PELTON Long Stroke Hydraulic Pumping Jacks now ranges from 10 to 30 ft. surface strokes and from 20,000 to 40,000 lb. polished rod load ratings. For complete details, request PELTON'S 1951 Catalog.

Send for Catalog

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560,000 bbl. per day production that comes from Iran, together with the facilities of her 600,000 bbl. refinery at Abadan, would flow to the benefit of the Russian effort at world domination.

"Kuwait with 11 billion barrels adjoins Iran, and the same company, the Anglo-Iraninan Oil Co., Ltd., that operates in Iran, owns 50 per cent of the reserves in Kuwait in partnership with Gulf Oil Corp.

"Those countries over there around the Persian Gulf being neighbors are pretty apt to copy what the other does.

"The Russians have a great way of infiltrating their propaganda.

"It is quite a commentary on England's socialistic trend when she nationalized so many of her industries, that she should make great protestations when Iran decided to nationalize her oil. I just wonder how much standing England would have in an international court objecting to the nationalization of oil by Iran when she herself, England, had nationalized so many of her industries."

—Ernest O. Thompson, Texas Railroad Commissioner, in a speech before the North Texas Oil and Gas Association.

Gas' Importance

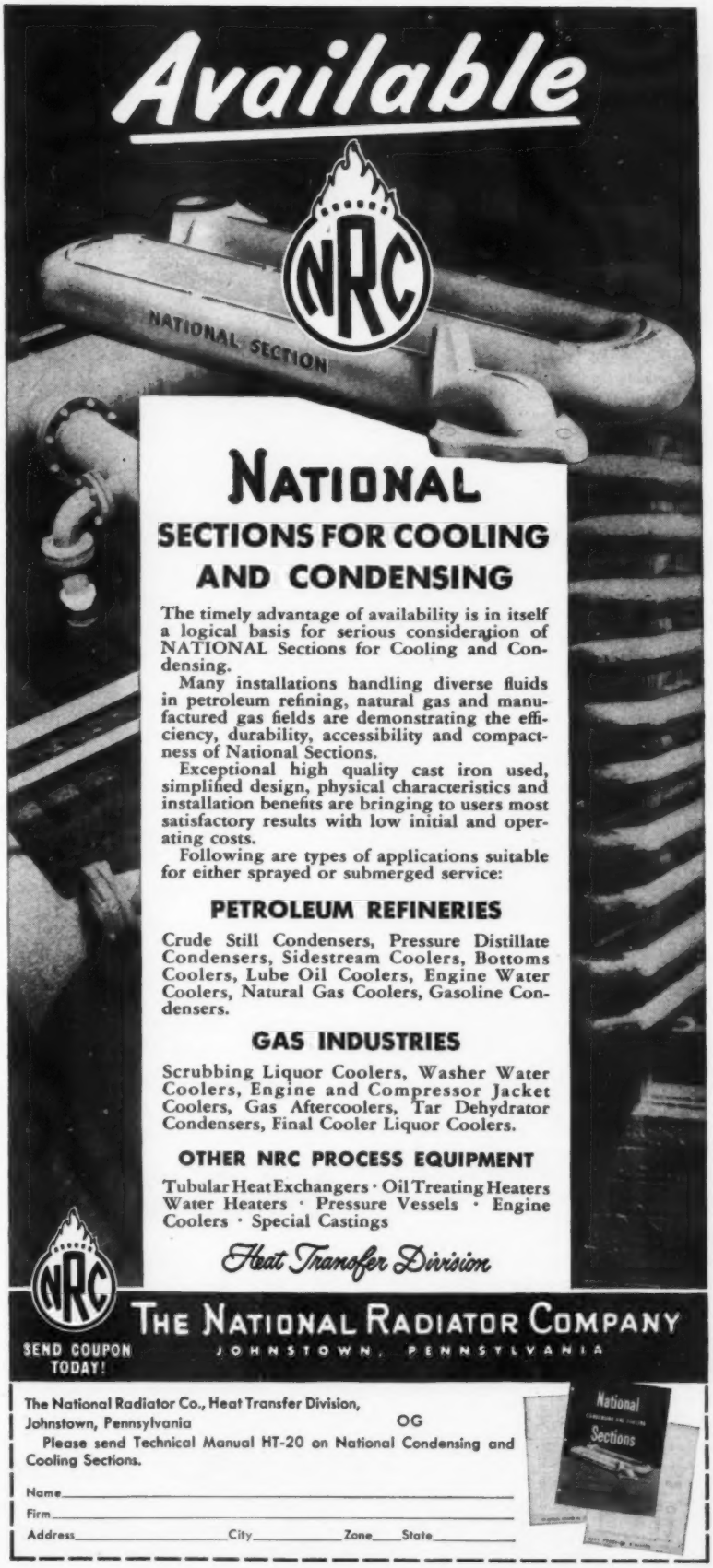
"More than 50 per cent of the great plants of the chemistry industry are located on the Gulf Coast of Louisiana and Texas because of access to large volumes of natural gas at low cost from the vast gas fields of that area. No war can be fought successfully and no economy can be maintained in modern times without a vigorous and expanding chemical industry. Natural gas is essential for this purpose.

"In the making of steel, natural gas is an absolute essential in certain heat-treating processes. . . .

"Natural gas is playing an increasing part in the production and processing of aluminum. . . .

"The past 5-year period has been the period of greatest expansion in the history of the natural-gas business and yet during that period the proven reserves of natural gas, after consumption, have risen from 160 trillion cubic feet to 185 trillion cubic feet. Thus, despite the phenomenal increase in the use of this commodity, the known reserves have increased more than 25 trillion cubic feet.

"So long as this trend continues there is no occasion to be concerned about the exhaustion of the reserves. So long as this trend continues there is no necessity to construct or put in operation plants for the production of synthetic high-B.t.u. gas from either coal or oil shale. The technology of the construction and operation of such plants should be fully developed as rapidly as such technology can be advanced but so long as the reserves are rising each year there is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NATIONAL
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Many installations handling diverse fluids in petroleum refining, natural gas and manufactured gas fields are demonstrating the efficiency, durability, accessibility and compactness of National Sections.
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GAS INDUSTRIES
Scrubbing Liquor Coolers, Washer Water Coolers, Engine and Compressor Jacket Coolers, Gas Aftercoolers, Tar Dehydrator Condensers, Final Cooler Liquor Coolers.
OTHER NRC PROCESS EQUIPMENT
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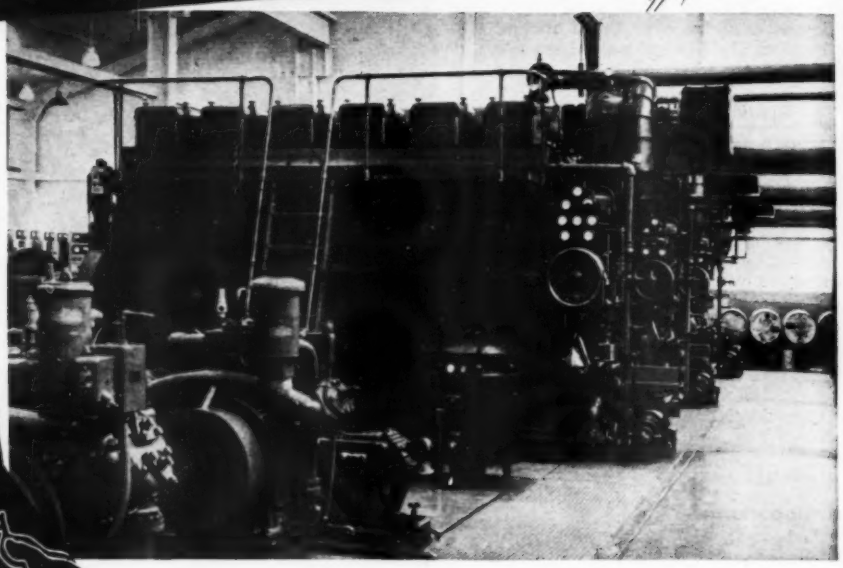
National Sections

How "TAPLINE" is powered to bring oil across SAUDI ARABIA

Some of the 40 Worthington Supercharged Diesels installed at five stations along Tapline, operated by the Trans-Arabian Pipeline Co. Other Worthington equipment on this project includes centrifugal refrigeration compressors for air conditioning.



Worthington Diesel Engines Selected In The Largest Single Peacetime Diesel Contract Ever Awarded

Worthington Diesels were the choice for "Tapline", the huge, recently completed engineering project that is carrying oil from the oil-rich Persian Gulf area across the Saudi Arabian Desert to the Mediterranean — bringing a vital commodity 3,500 miles and 10 days nearer to European markets.

Fueled by crude oil bled from the line, 40 Worthington Diesels, at five stations along the 1068-mile system, are an unfailing source of economical, trouble-free power. Their services include pumping oil through the line (over 13 million gallons daily), generating power for 10 centrifugal compressors used for air conditioning the maintenance quarters, for pumping tremendous quantities of water needed at each station, and for lighting the communities at the stations — each of which has electrical requirements equal to an American town of 7,000 population.

Everywhere In The World . . .

Worthington Diesels on pipeline duty and in many other services are proving that this company's pioneering in Diesel building and development pays off in better, lower-cost engine performance. For further facts proving *there's more worth in Worthington*, write to *Worthington Pump and Machinery Corporation, Engine Division, Buffalo, N. Y.*

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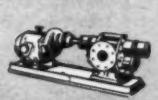
WORTHINGTON-BUILT AUXILIARIES

Balanced Angle Compressors



Oil Transfer Pumps

Cooling Water Circulating Pumps

Evaporative Type Engine Water Cooler

certainly no occasion to put such plants into commercial production."

—Paul Kayser, president, El Paso Natural Gas Co., in a speech before the Mid-Continent district meeting, American Petroleum Institute, Division of Production, Amarillo.

CALENDAR

April

American Gas Association, distribution, motor vehicle, and corrosion conference. Hotel Peabody, Memphis, April 16-18.

American Society of Lubrication Engineers, annual convention and lubrication show, Bellevue-Stratford Hotel, Philadelphia, April 16-18.

Petroleum Industry Electrical Association and Petroleum Electric Supply Association, twenty-third annual joint conference, Hotel Adolphus, Dallas, April 17-19.

National Petroleum Association, Hotel Cleveland, Cleveland, April 18-20.

American Petroleum Institute, Rocky Mountain district spring meeting, Gladstone Hotel, Casper, Wyo., April 19-20.

Second Petroleum Recovery Conference, sponsored by Texas Petroleum Research Committee and petroleum-engineering department of Texas A. & M. College, College Station, April 19-20.

Florida-Georgia Gas Association, Hollywood Beach Hotel, Hollywood Beach, Fla., April 19-21.

Brussels International Fair, twenty-fifth annual event, Brussels, Belgium, April 21-May 6.

Southern Gas Association, Buena Vista and Edgewater Gulf hotels, Biloxi, Miss., April 23-25.

American Association of Petroleum Geologists, Society of Economic Paleontologists and Mineralogists, Society of Exploration Geophysicists, joint annual meeting, Jefferson Hotel, St. Louis, April 23-26.

Indiana Independent Petroleum Association, spring convention, Oliver Hotel, South Bend, Ind., April 25-26.

Natural Gasoline Association of America annual convention, Mayo Hotel, Tulsa April 25-27.

Indiana Gas Association, French Lick Springs Hotel, French Lick, Ind., April 26-27

Pacific Coast Research Conference, Berkeley, Calif., April 26-27.

Interstate Oil Compact Commission, spring meeting, La Fonda Hotel, Santa Fe, N. M., April 26-28.

American Gas Association, industrial and commercial gas section, industrial gas school, William Penn Hotel, Pittsburgh April 29-May 4.

American Geophysical Union, thirty-second annual meeting, National Academy of Sciences, Washington, D. C., April 30-May 2.

American Petroleum Institute, division of refining, sixteenth mid-year meeting, Mayo Hotel, Tulsa, April 30-May 3

Materials Handling Conference, International Amphitheatre, Chicago, April 30-May 4.

May

American Institute of Electrical Engineers, District 1 meeting, Hotel Syracuse, Syracuse N. Y., May 2-4.

New York Oil Heating Association, Inc., Hotel Statler, New York, May 7.

American Gas Association, Natural-Gas Department, Dallas, May 7-8.

Independent Petroleum Association of America, mid-year directors' meeting, Cosmopolitan Hotel, Denver, May 7-8.

Gas Appliance Manufacturers Association, natural-gas department spring meeting, Dallas, May 7-9.

Liquefied Petroleum Gas Association annual convention and trade show, Stevens Hotel, Chicago, May 7-10.

American Petroleum Institute, division of production, Pacific Coast district, spring meeting, Biltmore Hotel, Los Angeles May 10-11.

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• It's the *differences* between Snap-on professional tools and ordinary, over-the-store-counter equipment that make Snap-ons "the choice of better mechanics." Those differences add up to a mighty satisfying total!

On factory production and plant maintenance, as well as in service shops by thousands, Snap-on hand and bench tools keep tool costs low by *lasting longer* and *serving better*. That's gone on for 30 years. Which means—

Snap-on tools *must* have *everything* it takes, in right design, right steels, right manufacture... and *direct-to-industry distribution.*

The list of plants served by Snap-on reads like a Blue Book of American industry. Exclusive national distribution through 41 direct factory branches. Write for catalogs.

Write for your FREE copies of Special Industrial Catalog and 104-page General Catalog of 4,000 fine Snap-on Tools.

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INDUSTRIAL DIVISION

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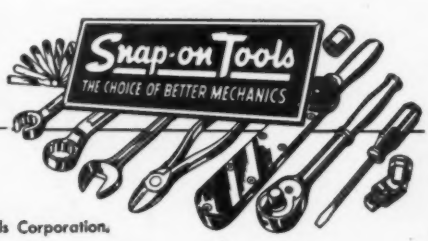
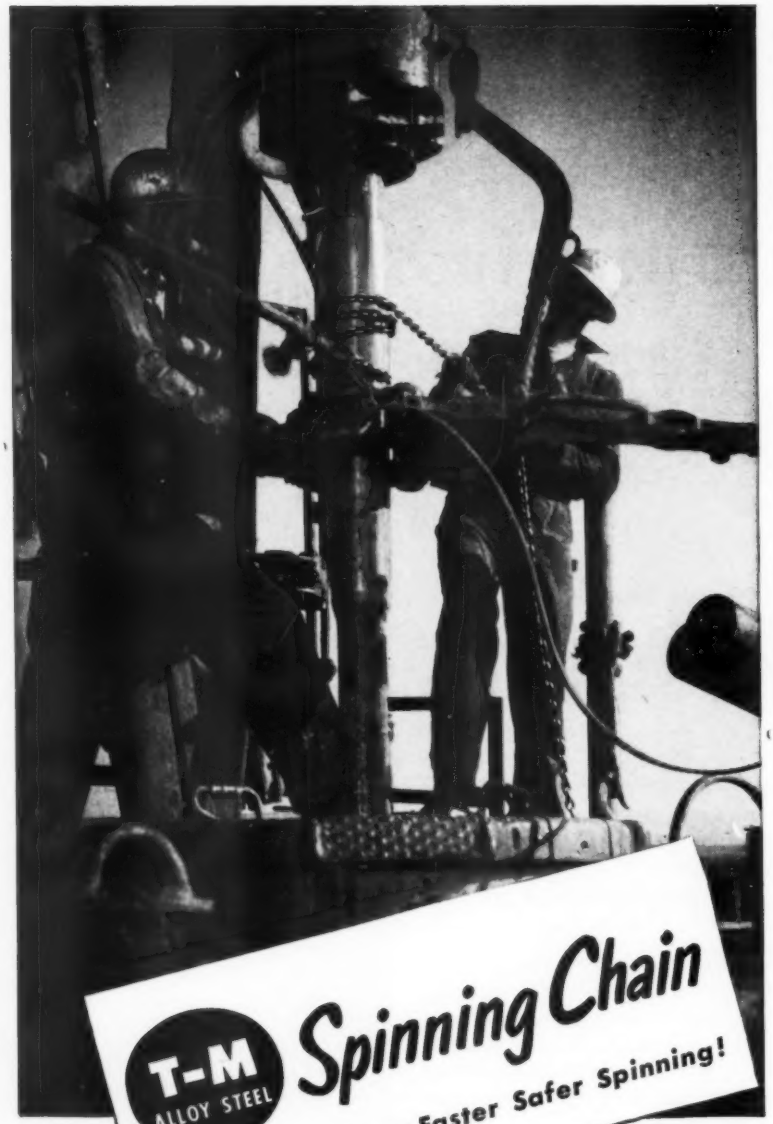
Kenosha, Wisconsin



*Snap-on is the trademark of Snap-on Tools Corporation.



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Pennsylvanian Geology and Mineral Resources of Western Indiana, fifth annual field conference, sponsored by division of geology, Indiana Department of Conservation, and department of geology, Indiana University, Bloomington, Ind., May 11-13.

American Institute of Chemical Engineers, regional meeting, Hotel Muehlebach, Kansas City, May 13-16.

American Gas Association, operating section, production and chemical conference, Hotel New Yorker, New York City, May 14-16.

Pennsylvania Gas Association, Wernersville, Pa., May 15-17.

Pacific Coast Gas Association, annual transmission (technical) conference, Bakersfield, Calif., May 16-17.

American Institute of Electrical Engineers, District 5 meeting, Loraine Hotel, Madison, Wis., May 17-19.

Empire State Petroleum Association, Inc., Hotel Statler, Buffalo, N. Y., May 20-22.

Second annual John Zink Process Heating Seminar, John Zink Co., 4401 South Peoria Avenue, Tulsa, May 26.

American Petroleum Institute, division of marketing, mid-year meeting, Cincinnati, May 28-29.

Third World Petroleum Congress, Kurhaus, Scheveningen, the Netherlands, May 28-June 6.

American Petroleum Institute, standardization and standing committees, division of production, mid-year meeting, Brown Palace Hotel, Denver, May 28-June 1.

Institution of Gas Engineers, London, England, May 29-June 1.

Natural Gas and Petroleum Association of Canada, Royal Connaught Hotel, Hamilton, Ont., May 31-June 1.

June

Society of Automotive Engineers, Inc., summer meeting, French Lick Springs Hotel, French Lick, Ind., June 3-8.

New York Oil Heating Association, Inc., Hotel Statler, New York, June 4.

American Society of Mechanical Engineers, semiannual meeting, Toronto, Ont., Canada, June 11-15.

Pennsylvania Grade Crude Oil Association, 1951 annual meeting, Hotel William Penn, Pittsburgh, June 14-15.

Canadian Gas Association, Bigwin Inn, Lake of Bays, Ont., Canada, June 16-20.

Petroleum Equipment Suppliers Association, annual meeting Chateau Frontenac, Quebec, Canada, June 17-20.

American Society for Testing Materials, annual meeting, Atlantic City, N. J., June 18-22.

American Institute of Electrical Engineers, summer general meeting, Royal York Hotel, Toronto, June 25-29.

July

Wyoming Geological Association, sixth annual field conference, Rawlins, Wyo., July 31-August 3.

August

Society of Automotive Engineers, Inc., West Coast meeting, Olympic Hotel, Seattle, August 13-15.

American Institute of Electrical Engineers, Pacific general meeting, Multnomah Hotel, Portland, Ore., August 20-23.

NOMADS

Tulsa Nomads, third Friday of each month. After Five Room, Tulsa Hotel.

Dallas-Fort Worth Nomads, first Monday of each month, Greater Dallas Club.

Houston Nomads, second Monday of each month. Ye Ole College Inn, Houston.

Los Angeles Nomads, second Wednesday of each month, Jonathan Club.

New York Nomads, first Monday of each month, Louis Sherry's, 300 Park Ave.

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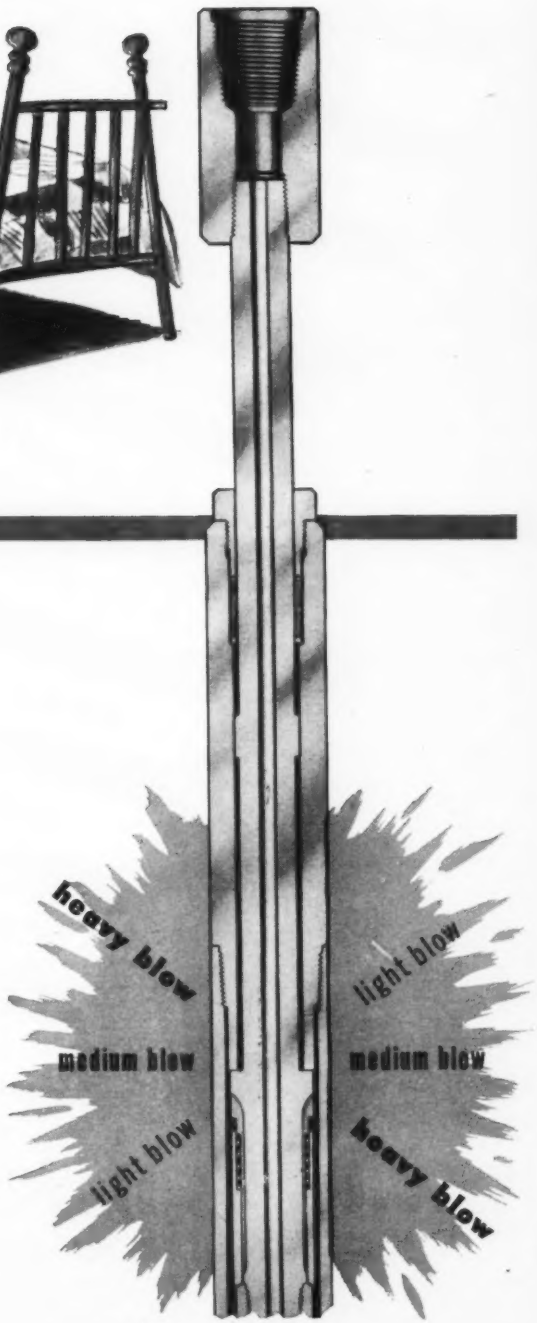
Jarring Jerry



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JOURNALLY Speaking

Naft . . . Phui

WHEN the wind blows down the Shatt al 'Arab, according to a news bulletin from the National Geographic Society, skullcapped Iranian fishermen are apt to grimace, jerk a thumb upstream, and say "Naft . . phui."

"Naft" is Persian for petroleum, and "phui" means just what you think it does. These chaps don't like the smell of Anglo-Iranian's big refinery at Abadan. To judge from current news reports, a lot of Iranians are saying phui to the whole oil operation in their country. They want to take over and run it themselves. We predict that if they try this there will soon be a much worse smell on the delta of the Tigris and Euphrates—Commies . . . phui.

Posthole Loophole

THE Texas Railroad Commission is confronted with a grave legal problem which threatens its control over the oil industry. The law says no one can drill for oil without a permit from the commission, but a man out near Colorado City, Tex., has found a way to beat it. He just went out along the bank of the Colorado River and dug a well by hand, total depth 3 ft., 6 in., from which he can produce 1 bbl. of oil per hour. He claims digging isn't drilling, so the law can't touch him. This is a serious loophole. Liable to undermine the whole conservation system.

Better Than Free Air

SOME publications are given away free, but not the Big Yellow Book. We figure that a man is a lot more apt to read, appreciate, and believe in a magazine he pays for than one that just drops in over the transom. But with the prices of everything going up so these days, the Journal is coming close to costing next to nothing, comparatively speaking. At least those are the sentiments of a Louisiana refinery engineer who sent in his three smackers for a renewal accompanied by this note:

"If, just if, I could only secure the value for every dollar from the butcher, baker, etc., who reaches down into my pocket that I receive from the cost of the Journal I believe I could at least be on speaking terms with the 'monkeys'. It is the mostest for the littlest that I ever experienced except maybe free air, and I can't breathe deep for fear of contracting 'fresh air poisoning'."

The Journal isn't quite as free as air, but it's better; you can breathe of it just as deeply as you want without fear of contracting any kind of poisoning.

Serendipity

OUR Bert Linz, who is an old hand at deciphering government gobbledegook and the esoteric circumlocutions of Ph.D. braintrusters, has uncovered a little word which he says should be in every oil man's vocabulary—serendipity.

He reports that according to the economic research department of the U. S. Chamber of Commerce, which smoked the word out of somebody's unabridged unabridged, serendipity describes the case of being bailed out of difficulties by fortuitous accidents and that in turn can be defined as just plain bull luck like bringing in a 1,000-bbl. well just as you are about to quit drilling in disgust, or inventing penicillin when you're really looking for something else, or having the power fail just as you are about to sit down in the electric chair.

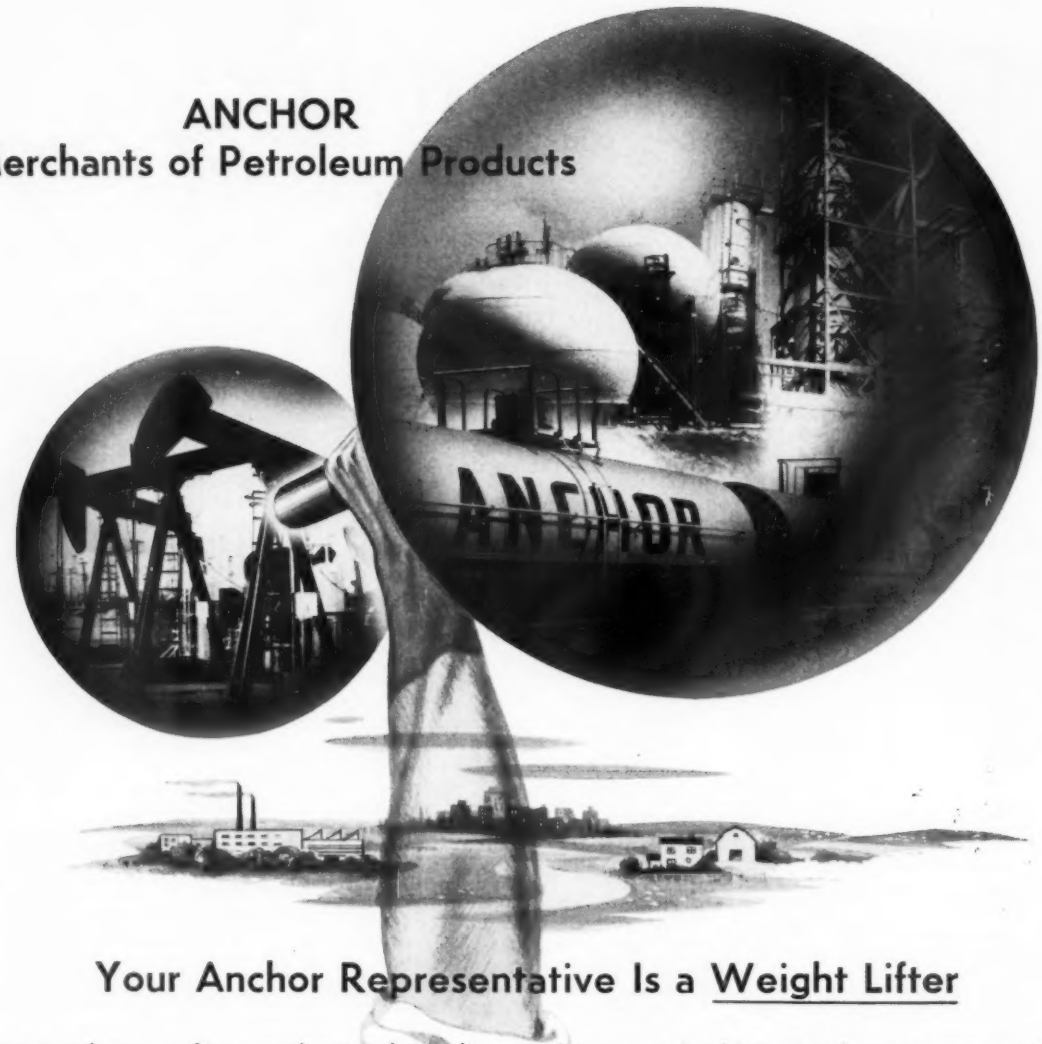
Serendipity is a smooth little word, easy to remember and easy to say. It's a nice word to know and a nice thing to have.

Carcinogenic, Too?

AN investigation of "potential carcinogenic environmental hydrocarbons" is to be made by University of Southern California under a grant from the U. S. Public Health Service. This means a study of whether or not any constituents of petroleum are capable of causing cancer. We have heard of oil being the cause of ulcers, high blood pressure, and insomnia, but this is the first time we ever heard of it being suspected as a cause of cancer. However, oil has been blamed for just about all the other ills of mankind, so probably it can stand one more investigation.

—*Henry D. Ralph*

ANCHOR
Merchants of Petroleum Products



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Many producers, refiners and natural gasoline men are saddled with a responsibility that is out of their line. They are hard-working, competent men with the technical know-how, and a natural love for, getting oil out of the ground or processing it into one of its many products. But they must take time away from their first love in order to peddle their products at a profit or to intelligently buy crude products to process —essentially a marketing specialist's job.

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the OIL AND GAS JOURNAL

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DO YOU KNOW HOW "Metal Petals" BRING YOU SUCCESSFUL CEMENTING RESULTS?

In any cementing where a lower zone must be protected from contamination by the cement slurry (as well as from sloughings or cavings) the Baker METAL PETAL Basket will be found both safe and successful.

The unit is constructed of a number of individual "petals" made of flexible sheet metal. These petals are mounted on reinforcing spring steel ribs, which in turn are mounted on a ring to form the Basket.

When running in the hole, the upward pressure of the fluid tends to close the "petals" thus providing fluid passageway between the Basket and the walls of the hole, without distortion of the Basket. As soon as the casing comes to rest, upward pressure by the fluid is relieved and the petals expand to contact the walls of the hole. Any tendency of fluid to move downward then presses the flexible petals more firmly against the entire circumference of the hole. Solids strained from the fluid tend to build a bridge inside the Basket which is thus converted into a one-way packer of great strength and effectiveness.

SIMPLE, EFFECTIVE ACTION

The "Metal Petals" not only expand to contact the entire circumference of large diameter holes, but also pack-off in holes of irregular shape; and the independent action of the individually mounted overlapping petals permits successful use of the Basket in casing programs with minimum clearances.

All-metal construction and design provide ample strength; lessen the possibility of splitting or otherwise damaging the Basket while it is being run in; and the metals are unaffected by usual acids employed for various purposes.

MOUNTINGS TO MEET ALL NEEDS

Baker Metal Petal Baskets are furnished mounted on plain or perforated nipples; with or without different types of Baker Whirler Float Collars; for a wide range of cementing applications. When conditions permit, it is recommended that Baker Metal Petal Baskets be "slidably" mounted to allow rotation, spudding, or reciprocation of the casing without distorting or damaging the Basket. Maximum efficiency of Baskets is assured when a Baker Model "G" Casing Centralizer is used immediately below the Basket assembly. For details see the Baker (or Composite) Catalog; or ask any Baker representative for specific recommendations.

TOP, Baker Metal Petal Basket (Product No. 340) ready for assembly into any required cementing hook-up. The strong, spring steel ribs, each with a "metal petal" attached, expand against the wall of the hole to form a safe "one-way" packer which prevents downward movement of the cement slurry.

LOWER VIEW illustrates the overlapping "petals" (each mounted on its individual spring steel rib) thus providing flexibility and freedom of expansion to pack-off around the circumference of large-diameter holes, or holes of irregular contours. A Baker Model "G" Casing Centralizer mounted just below the Basket is recommended.

LEFT, a popular hook-up consisting of a Baker Metal Petal Basket mounted on nipple, with a Baker Cement Whirler Float Collar with Solid Baffle (Product No. 305) which causes the cement slurry to pass through the baffled, side-whirler ports.

RIGHT- Where the casing is to be rotated or reciprocated while cementing, the Metal Petal Basket is "slidably" mounted between two Stop Rings. This permits free rotation, and ample vertical movement of the casing, without distorting or damaging the Basket.

HERE'S AN EXAMPLE OF STRENGTH

The Baker Metal Petal Basket holds a record for keeping cement ABOVE and OUT OF a "zone" possessing *lower formation pressure* and *higher permeability* than is likely to be encountered in any oil well. The "zone" was an *open* coal mine stope (lateral) through which a 16-inch hole had been drilled. A Baker Metal Petal Basket, mounted on 10¾" casing (used as the surface string) successfully supported a 640-foot column of cement slurry above the stope, without breakdown or leakage. This example not only demonstrates the bridging ability of the Basket assembly, but also is evidence of the tremendous structural strength which it possesses.

BAKER METAL PETAL BASKET PRODUCT NO. 340

BAKER OIL TOOLS, INC.

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To North Dakota

Welcome, North Dakota, to the ranks of the oil-producing states. That successful wildcat brought in near your northwest corner last week undoubtedly will qualify you to become the twenty-seventh state producing commercial quantities of oil and gas.

Until now your contacts with the oil industry have been almost entirely those of a consumer, and at times you have complained about what seemed to you to be high costs of serving your communities remote from producing and refining centers. Now you will see at first hand some of the tremendous investments which lie behind the filling-station pump.

You will be visited by a horde of strangers, oil men from other areas. They come as developers, not exploiters. True, they are looking for profits for themselves, but without the chance for individual profit there would be no oil industry in any of your sister states. By dealing with these men fairly and sanely you will promote the development of new wealth which will benefit you and them and the whole nation.

This new wealth will be slow in developing. Your oil well attracts nation-wide attention because it is in completely virgin territory, far from other production. Strikes just as big are made every week in other parts of the nation with only routine attention. Your deep drilling will be costly, and no game for amateurs, and your oil, when produced, must be transported great distances to refineries.

Huge sums of money must be spent before you really have an oil industry—money from outside your borders. But this money will come to you so long as you provide a favorable climate for it. It will bring drilling rigs, tank farms, transient crews, possibly new towns, pipe lines, and refineries. If your well lives up to its promise, your oil will bring you not sudden riches but a stable, enduring economic asset.

Another thing about the oil industry which you should bear in mind, North Dakota, is that this well is not just somebody's lucky find. It is the product of an incalculable amount of scientific knowledge and careful study, of indomitable faith in the results of this study, and of tremendous courage in risking large sums of money to back up this faith. Many times your territory had been written off as unpromising, but oil men are of a breed which never gives up and to which every obstacle is a challenge.

This is the oil industry which now invades your prairies, a stable and well-behaved industry but one still young and vigorous. It finds oil where men say there is no oil, and will continue to do this, in your state and elsewhere, so long as there is hope of a fair reward.

The oil industry welcomes you, North Dakota, and if you will welcome it you will be well repaid in a partnership for mutual prosperity and economic development such as has benefited twenty-six of your sister states.

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THIS WEEK

CONTROLS—Second of five oil-industry orders put in effect. . . . Sales of all light products except at retail level covered. . . . Other three regulations to be issued "shortly." . . . ¶Allocation of steel for tank-car construction to be cut in May. . . . Drop in monthly output of 1,000 rail cars of all types anticipated. . . .

PRODUCTION—United States crude-oil production sets new world's record, for first time exceeds 6,000,000 bbl. per day. . . . ¶Amerada opens production in North Dakota with 350-bbl. discovery in Williston basin. . . . ¶Mississippi wildcat within 85 ft. of new world's record depth; operator may complete as gasser or test further. . . .

INTERNATIONAL—I.P.C. makes new concession-revision offer to Iraq Government which eventually would lead to full government sharing in company's profits. . . . ¶British officials arrive in the United States to discuss Middle East situation. . . . ¶American oil men reported offering to operate Iran's petroleum industry. . . . ¶High attendance expected at Third World Petroleum Congress.

INDUSTRY—PAD officials begin "flying circus" tour, hold opening session in Houston to tell oil men of troubles which lie ahead. . . . ¶A.P.I. meeting in Columbus highlighted by PAD officials' discussion of tubular-goods problems. . . . ¶Columbia Gas System president tells A.P.I. that government regulation of natural-gas prices is causing "orgy" of expansion in use of the fuel without due regard to economic value. . . . ¶In major management change, John W. Brice is named to new position of board chairman of Carter Oil Co. . . . L. W. Elliott, president of Standard-Vacuum Oil Co., nominated for election as director of Standard Oil Co. (N. J.) to succeed Brice. . . .

WASHINGTON—MRO provisions of tubular-goods Order M-46 do not apply in case of operator requiring small amount of capital equipment to drill wells, PAD declares in clarifying order. . . . ¶Revised list of essential activities issued by Commerce Department for guidance in deferments. . . . ¶Quick amortization of new refineries criticized as not all for defense needs. . . .

ACTIVITY—Crude production for week April 7 averaged 6,056,625 bbl. daily, up 88,325 bbl. daily. . . . ¶Well completions increased to 810 for the week compared with 718 for same week last year. . . . Wildcat completions increased 67 wells for the week to 207, compared with 136 for same week in 1950. . . . ¶Total rotary rigs operating in United States on April 2 amounted to 2,233, off 17 rigs from previous week but up 225 rigs from same date last year. . . .

TRENDS—Primary stocks of four major products, located east of California at the end of March, were greater by 18,247,000 bbl. or 10.4 per cent than at the end of March 1950. . . . ¶Indicated major-product demand at east-of-California refineries for 4-week period ended March 31 was up only 5.1 per cent over last year. . . .

PIPE LINES—Expected delays in pipe deliveries portend natural-gas shortages hampering defense production in East next winter. . . . Inability of transporting companies to complete expansion programs may mean peak-day deficiencies of as much as 1,000,000 M.c.f. . . . ¶Plans for huge Middle East pipe line apparently dropped as result of Iraq's refusal to grant right-of-way. . . . ¶Interior Department holds up approval on public-lands right-of-way for El Paso's 400-mile San Juan line. . . .

REFINING—New capacity of 700,000 bbl. daily will be needed by end of next year to prevent products shortages such as followed last war, Bruce Brown says. . . . Another 300,000 bbl. daily must be added during 1953, and still another 600,000 bbl. by 1956, Brown says. . . . ¶E. L. Shea tells Ethyl Corp. customers no TEL shortage exists now and will not occur in foreseeable future. . . .

NATURAL GAS—FPC narrows its investigation into Phillips Petroleum Co. operations down to one point: whether or not the firm is a natural-gas company as interpreted by the Natural Gas Act. . . . Hearings expected to be prolonged. . . .

MEN AND TOOLS.—It takes both to keep up oil production, but at the moment the biggest headache is tools. This week a deferment schedule was announced for men in essential petroleum activities, but PAD officials predicted more trouble ahead in obtaining sufficient equipment for industry needs.

Products Price Order

Second of five industry regulations covers all but retail sales of light products; already in effect

Bertram F. Linz

WASHINGTON.—A new pricing regulation covering sellers of petroleum products at all levels except retail was issued this week by the Office of Price Stabilization, to remain in effect until specific area price ceilings can be worked out.

The order was the second of five to be issued for the oil industry, the first being the regulation covering retail sales (*The Oil and Gas Journal, March 29, page 162*). The remaining regulations, to be issued shortly, will cover crude oil, asphalt and asphalt products, and lubricating oils, waxes, and related products.

Effective April 10, and designated CPR 17, the regulation covers all types of sales and deliveries by refiners, producers, processors, natural-gasoline or cycling-plant operators, blenders, resellers, "or any other person," of the following products:

Products covered.—Liquefied petroleum gases, natural gasoline, aviation gasoline, automotive and marine gasoline, all petroleum naphthas and solvents, benzene, toluenes and xylenes, stove and lamp gasoline and pressure-appliance fuel, condensate or distillates extracted in natural-gasoline or cycling plants or not moved as crude petroleum, jet-propulsion fuel, tractor fuel, kerosine, range oil, stove oil or heater oil, all other distillate burning, heating, or fuel oils, diesel fuels, gas oils, gas-enrichment oil, and residual fuel oils and blends thereof with distillate fuel oils.

Crude petroleum is covered when sold (1) to a processor for use as gas-enrichment oil, (2) to a tank-wagon reseller by sellers other than crude producers for resale to a consumer for a purpose other than the production of more than one petroleum fraction therefrom, or (3) to a consumer for a purpose other than the production of more than one petroleum fraction therefrom, but not sales to a refiner or to a person using such crude in oil and gas field operations.

Exemptions.—The order specifically exempts, in addition to retail sales:

Exchange of products between refiners or other petroleum sellers, provided prices at which such sales are made do not affect the level of existing ceiling prices;

Sales between corporations when one is a wholly owned subsidiary of the other, or when both are wholly owned subsidiaries of a third corporation, and sales between such other affiliated or controlled corporations as are especially excepted by order in writing of the Director of Price Stabilization or his duly authorized representative, also provided prices of such sales do not affect the level of existing ceiling prices;

Sales of aviation gasoline of 100 octane (A.S.T.M.) or higher to a defense agency or to any person in connection with a defense contract or subcontract;

All sales of benzene, toluene, and xylenes;

Interrefinery sales of petroleum fractions made at the direction of the Petroleum Administration for Defense;

Sales of special hydrocarbon fractions of liquefied petroleum gas for use in manufacturing the following products or components of such products: Synthetic rubber; aviation gasoline of 100 octane or higher, toluene, benzene, or their components, when sold to a defense agency or to any person for use in connection with a defense contract or subcontract;

Sales of any product pursuant to a contract which is officially classified as "secret."

Exports.—Ceiling prices for export will be those provided by the regulation plus additions permitted by any export regulation which may be issued. The ceiling prices of the order will apply to imports, regardless of origin.

In removing oil from the coverage of the General Ceiling Price Regulation, the OPS provided formulas by which sellers will compute their prices as follows:

Ceiling price based on sales: The ceiling price for each seller at each shipping or delivery point shall be the highest price charged at that point by him during the period December 19, 1950, to January 25, 1951, inclusive, for a sale of a particular grade of product to a purchaser of the same class.

Ceiling price based on offering price: If a seller is unable to determine a ceiling price under the sales formula, the ceiling price for such seller at each shipping or delivery point shall be his highest offering price at the shipping or delivery point during the December 19-January 25 period for a sale of a particular grade of product to a purchaser of the same class.

Ceiling price based on competitive or in-line ceiling price: (1) ceiling price of another seller: When a seller at a given shipping or delivery point is unable to determine a ceiling price under either of the two preceding formulas, his ceiling price at the particular shipping or delivery point shall be the highest ceiling price of any seller of the same class to a purchaser of the same class for the shipping or delivery point, but this method cannot be used unless the seller's records show that for the purpose of such sale he has adopted as his ceiling the ceiling price of such other seller; (2) in-line ceiling price: If under the foregoing method a seller arrives at a ceiling price which is not in line with the price he would have arrived at by use of his customary pricing practices in the same general area during the base period, he may nevertheless sell at a price in line with his price for the product at other comparable points which reflects his customary pricing practices, in such event filing with the petroleum branch of OPS within 15 days after making a sale the in-line price, stating his proposed ceiling price and in what way the ceiling price determined according to the price of a competitive seller of the same class is inconsistent with the customary pricing practices of the seller.

Final pricing method: If under other provisions of the regulation, a seller is unable to determine his ceiling price at a given shipping or delivery point he may nevertheless make a sale; if he wishes he may request a ceiling price before making a sale, but if he does not do so must within 15 days file a written request with OPS for approval of a ceiling price, explaining why he cannot establish a ceiling price.

Natural gasoline.—In the case of natural gasoline, in addition to formula prices, special provisions are made for sales in areas where it is customarily purchased and sold on the basis of posted purchase prices, as follows:

The ceiling price for natural gasoline from any given field shall be the posted purchase price as of January 25, 1951, for said field;

Where there was for any field more than one posted purchase price, the ceiling price shall be the highest of the posted purchase prices;

Notwithstanding the above where a contract was in effect on January 25, 1951, which was made prior to December 9, 1950, for the purchase of natural gasoline at the receiving tank at a price in excess of the highest posted purchase price for the given field and deliveries were made prior to January 25 in accordance with such contract, the price actually charged on January 25 shall be the ceiling for the contract, and on termination of

the contract any purchaser may purchase the production involved at the January 25 price regardless of any posted purchase price.

Still frozen. — OPS officials pointed out that prices under the new order are still frozen at the base-period levels which they said in general are equal to or lower than price levels in 1948 and 1949, and expressed the belief that few if any price increases would result.

Tailored regulations for the oil industry are necessary, Director Michael V. DiSalle explained, because the general price regulation had affected the pricing practices of the industry to a point where it appeared certain supplies for the defense program might be adversely affected.

"The provisions of the general freeze of last January 25 are unsuited to the petroleum industry," DiSalle said. "A set of distorted price relationships had been frozen by that regulation into ceiling prices. Representative members of the industry have stated that distortions caught by GCPR may result in dislocations of supplies vital to the defense program. This view is supported by the Petroleum Administrator for Defense. The new ceiling regulation permits removal of these distortions without changing over-all ceiling prices."

Hardship cases.—The order provides machinery for the granting of relief in various "hardship" circumstances, such as where an existing or threatened local shortage may be substantially reduced or eliminated by price adjustments; in depressed-price areas and where price inequities exist; and with respect to government contracts where the ceiling price of the regulation impedes or threatens to impede production, manufacture, or distribution of a commodity essential to the defense program.

The order provides that sellers may increase their ceiling prices by the addition of any increases in transportation costs or taxes. The increase may include the increased costs to the seller or his reseller customer resulting from transportation-rate increases permitted after January 25, 1951, by federal or state regulatory bodies or OPS; and where transportation is in facilities owned or controlled by the seller the same increase may be made where the movement involved is in lieu of transportation by regulated carriers.

There also may be added by the seller an amount not in excess of the transportation tax of the Revenue Act of 1942 if the seller incurred such tax, as well as any tax increase or new tax after January 25 on or incident to the sale, production, gathering, severance, transportation, delivery, processing, or use of any product except import duties if the seller is required by law to collect or pay such tax.

How to Get Materials

Here are the men to write, wire, or phone for help in obtaining supplies for all oil and gas activities

WASHINGTON.—The materials division of the Petroleum Administration for Defense is now set up so that oil operators having problems may quickly contact the men who can best help in obtaining materials, equipment, or supplies not covered by the priorities assistance provided for maintenance, repair, and operating supplies in the National Production Authority tubular-goods order M-46.

Still to be set up is a projects or facilities construction branch which will handle materials problems involved in the construction of new or expanded facilities, such as recycling plants, refineries, or pipe lines. This office is to be activated in the near future, as soon as a qualified man is selected to head the work.

The materials division is headed by Frank A. Watts, since 1919 connected with Humble Oil & Refining Co., for the last 5 years as sales manager. Watts, a professional engineer and architect, also served the Government in the last war, as director of the materials division of PAW from December 1942 through April 1944.

Assistant director of the division is Herbert R. Hansen, on leave from Superior Oil Co., with which he has been connected since 1939, his last post being purchasing agent of the Pacific division. Prior to joining Superior, he was connected for 17 years with National Supply Co. During the war he served from January 1942 until August 1943 with PAW, first as a specialist on materials and later as assistant director of the materials division.

Where all available means of expediting the delivery of needed materials prove unsuccessful, assistance can be secured by writing or wiring Watts, or, in emergencies, telephoning direct to the chiefs of branches dealing with the particular items involved.

Phone numbers.—The PAD telephone number in Washington is REpublic 1820. Watts' extension is 5397, that of Hansen 3380. Following is a list of branch chiefs, their telephone extensions, in parentheses, and the items they handle:

Production materials branch, which assists the production division in the distribution of casing, tubing, and drill pipe to operators under the M-46 order: Charles T. Reichert of Los Angeles (3097), who since 1917 has been connected with the National Supply Co., becoming sales manager of the California division in 1947, and in addition was engaged for several years in natural-gasoline plant and refinery activities.

Equipment manufacturers branch, handling materials required by manufacturers of oil-field drilling and producing equipment, including geophysical, surveying, and servicing companies: George E. Oller, Jr., of Parkersburg, W. Va. (5354), who, since graduation from Lehigh University as a mechanical engineer in 1930, has been employed by Parkersburg Rig & Reel Co., becoming manager of its Parkersburg plant in 1946.

Chemicals branch, responsible for all chemicals required for petroleum-industry operations: Theodore H. Herman, Jr., of St. Louis (3469), since 1926 in the sales-service branch of of Petrolite Corp. specializing in problems of dehydration, desalting, and corrosion prevention, and designer, in 1929, of the country's first refinery desalting installation.

Refining materials branch, handling materials required for operation of oil refineries including catalysts, tetraethyl lead, inhibitors, and additives: Roy P. Wilson of Wellsville, N. Y. (2986) resident engineer of Sinclair Refining Co., which he joined in 1929, and the April 1942 to August 1944 chief of the priorities section of PAW's construction division.

Transportation materials branch, responsible for materials used in the movement of crude and liquefied products by pipe line, including gathering lines: E. O. McClatchey of Tulsa (5351), World War I veteran who worked for Empire Pipe Line Co., Phillips Petroleum Co. and, from 1920 until its absorption by Sunray Oil Co. in 1950, Barnsdall Oil Corp., from 1930 as purchasing agent, and formerly was chairman of the oil-company buyers' group of the National Association of Purchasing Agents.

Natural gasoline and gas materials branch, handling materials required for the operation of natural-gasoline plants; gathering, processing, compressing, transmission, and local distribution of natural gas, and production and distribution of manufactured gas: Charles E. Webber of Philadelphia (2967), from 1934 to 1942 engaged in research, design and operating problems of natural-gas production, processing, and transportation for Humble Oil & Refining Co., assistant director of PAW's natural-gas and gasoline division during the war, and since 1945 assistant manager of Sun Oil Co.'s natural-gas division.

Marketing materials branch, responsible for materials used in distribution and marketing of products including drums, containers, bulk storage tanks, and marine terminal equipment: Rolland P. Wood of Chicago (4752), for the past 23 years em-

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WATCHING WASHINGTON

Bertram F. Linz

"Soft" Controls

It's a tug of war between Congress and the emergency agencies over who is to run the defense program, and so far the stronger pull has been exerted by Congress.

A number of congressional committees have been studying the activities of the agencies, and this surveillance has had a salutary effect since Congress is not only keeper of the purse but can, and frequently does, subject government officials to sharp questioning.

Under these circumstances it is not surprising that the defense agencies have back-tracked on orders to which there is considerable industry or public opposition even though officials support their policies vigorously.

Thus, while the National Production Authority so far has successfully resisted any substantial easing of its rubber-curtailment order, it bowed to a congressional demand that it postpone the imposition of restrictions on the use of aluminum.

One of the weak spots of the whole program is the lack of enforcement of orders. Both the NPA and the Office of Price Stabilization have spoken of vigorous policing, but so far the OPS has come up with only one violator of its price-control orders and the NPA hasn't claimed even that much.

In sharp contrast, Petroleum Administration officials are seeking a formula which will insure that proper use is made of the tubular goods which they will distribute, which will be more than a police regulation and prevent violations rather than merely catch violators.

Through the Wringer

Disclosures of scandal and grabs of power by the defense agencies are expected to bring about some changes in the permanent organization of the Government.

Currently under consideration in Congress is the President's plan to reorganize the Reconstruction Finance Corp., which emanated an unpleasant odor when dissected by Sen. J. William Fulbright of Arkansas who, incidentally, sharpened his knife only after President Truman had dismissed an earlier report on RFC shortcomings as "asinine" and made the southerner fighting mad.

But there is a growing sentiment in Congress to protect the RFC against White House influence, "friends of friends" of officials, and others who seem to have had the knack of getting loans on assets of questionable value by depriving the agency of its authority to hand out money and limiting it to participating in guaranteeing loans made by private banks.

Another agency which will be put through the wringer and apparently is slated for the waste basket is the once highly touted National Security Resources Board. That agency was to be the planning body for the President, but the Office of Defense Mobilization has absorbed most of its functions, and it is expected that as soon as a job can be found for Chairman W. Stuart Symington the NSRB will be added to the list of agencies that once existed.

Short Sulfur

An allocation system for sulfuric acid is being set up by the National Production Authority to go into effect June 1, but initially will provide for control of supplies for refiners and other consumers only in 11 western states.

In those states, including and running west from Montana, Wyoming, Colorado, and New Mexico, it will be necessary for acid suppliers to get specific authority from the NPA to make deliveries, but throughout the rest of the country no authorization will be necessary, for the time being, although NPA will require suppliers to make monthly reports of orders on which they propose to make deliveries.

For the present, at least, consumers of sulfuric acid will not be required to apply to the NPA for authority to accept deliveries, but will have to certify to their suppliers the use to which the acid will be put.

Allocation of sulfuric acid will not solve the basic problem, which is the shortage of sulfur, and NPA now is engaged in a thoroughgoing study of the sulfur situation with a view to working out a program to expand production.

Primary cause of the shortage is the continued heavy export of sulfur, which ran in the neighborhood of 250,000 tons during the first quarter, and NPA may make an effort to reduce this movement, which will meet with stiff opposition from the British who used ECA funds to build a plant to run on American sulfur and already are complaining that supplies have been cut.

ployed by Pure Oil Co. as designing and construction engineer and was in charge of field construction of the oil-industry exhibit at the 1950 Chicago Lake Front Fair.

Foreign materials branch, E. C. Austin of New York (3380), connected since 1935 with Standard Oil Co. of California and its affiliated companies, principally in purchasing and traffic capacities; after service in the Army from 1942 to 1944, he returned to Arabian American Oil Co. as manager of its purchasing and traffic department, and later became vice president of Aramco Overseas Co.

Statistical analysis branch, which collects and compiles data for statistical reports and economic analyses of materials required in all segments of the petroleum industry: Earl W. Struwe of Arlington, Va. (5355), formerly statistician and economist of the Department of Agriculture and Interior Department and from July 1942 to October 1945 in charge of materials accounting and statistical work for PAW's materials division.

Expansion Goal

For oil it's below war needs but still high

WASHINGTON.—Expansion of oil production at a rate sufficient to meet the requirements of the defense program rather than those of an actual war appears now to be the aim of the administration so that critical materials may be available for use in other areas equally vital to defense but more difficult and requiring more time to build up.

Although Defense Mobilization Director Charles E. Wilson gave approval in a report to the President on the Petroleum Administration's program to build up oil production by 1,000,000 bbl. daily, his office has a policy memorandum insisting that all expansion programs be sharply scrutinized to avoid developing an industry geared to the needs of all-out war at the expense of other industries equally essential.

Readiness only.—Wilson also made it clear in his report that preparedness and not war is the goal of the present defense effort.

"We are producing primarily for readiness, not for all-out war," the ODM chief said. "Our requirements can be based mainly on reserve and defensive needs, plus an ability to move rapidly into all-out production if the need arises."

More oil.—Discussing the oil situation, Wilson told the President that the 8,000,000-bbl. daily capacity estimated as necessary by PAD means "expansion all along the line—in the rate of well drilling, in basic and specialized refining capacity, in transportation and distribution facilities."

Explaining that total demand for petroleum, including military requirements, now amounts to 7,700,000 bbl. a day, "one-third more than the World War II peak and nearly two-thirds higher than at the time of Pearl Harbor," Wilson reported that refineries are running at close to effective capacity and nearly 1,000,000 bbl. of crude and products is being imported daily.

Refinery facilities.—Wilson outlined the steps that have been taken to provide steel for production, but pointed out that "in addition to an expansion of basic crude-refining capacity, new catalytic cracking and reforming facilities are needed to manufacture high-octane gasoline.

"Additional plants are needed also to produce alkylate and other components used wholly or primarily in aircraft fuels, and new facilities are required to produce chemicals such as benzene and toluene from petroleum," he added.

Also, Wilson said, "substantially increased facilities for producing, transporting, and distributing gas would be needed to meet demands which by 1955 are expected to reach 8.1 trillion cubic feet annually, compared to 6.1 trillion in 1950."

Slowdown on Tax Relief

Quick amortization of new refineries criticized as not all for defense needs; loans and other aid considered

WASHINGTON.—Charges that the defense agencies have handed out certificates of quick amortization of new productive facilities with too lavish a hand have brought their issuance practically to a halt while agency heads seek to develop new policies which will meet with the approval of Congress.

Members of Congress who soon will be called upon to enact new tax legislation complained that quick amortization on an ambitious scale would imperil the administration's pay-as-we-go program for financing the defense effort by removing from taxation for 5 years large assured profits.

Subjected to particular criticism were certificates granted for projects planned prior to the Korean outbreak which would have been built, regardless of defense considerations, to meet anticipated civilian demand, specifically large new steel plants.

Revenue loss.—Reporting that 396 applications for amortization certificates for oil projects have been received by PAD, Deputy Administrator Bruce K. Brown told a House appropriations subcommittee that, depending on tax rates, the approval of all those applications would result in a revenue loss to the Treasury over a 5-year period ranging from $640,000,000 to more than $1,000,000,000.

However, Brown pointed out, if present tax rates were to be continued after 5 years some of this revenue would be recouped at rates ranging from $47,000,000 to $76,000,000 a year, but it would be 20 years before the Government got back the revenue it would forego during the amortization period and then only if taxes continued at their present or higher levels.

Brown told the committee that the 28 projects thus far approved by PAD are either to increase basic refining capacity or to rehabilitate wartime plants to make needed products such as 100 octane gasoline and alkylate.

Oil loans.—Most of the proposals for encouragement of new facilities which have been submitted to PAD are for certificates of necessity for quick write-off of investment, and only a few requests have been received for loans. Under the Defense Production Act, loans can be made to expand production and PAD has a fund of about $25,000,000 for that purpose, Brown disclosed.

"Some of the requests that we have had for loans have been from people who want to look for oil in the ground," Brown told the subcommittee. "There is only 1 chance in 10 of finding it, and we do not feel we want to put Uncle Sam's money in that."

PAD, however, also has received applications for refining loans but feels that in most cases the applicants will go ahead with regular RFC loans, Brown said. Many of these applicants are asking for more money than PAD believes they should have, he added, but the agency has been willing to approve tax-amortization certificates if they are able to raise the funds they want.

Capacity increasing.—In an address before the Western Petroleum Refiners Association at San Antonio last week *(see "Southwest")*, Brown said the projects covered by tax certificates already issued will increase national refining capacity by 370,000 bbl. daily.

Brown expressed the belief that the oil industry will develop all the additional productive capacity needed on its own initiative but made it clear that if tax amortization, recommendations for loans, and priorities assistance do not prove to be an adequate incentive "additional and alternate procedures" will be invoked, such as defense loans or government construction.

Government construction.—Such loans can be made under the Defense Production Act, he said, but there is no authority yet for government construction of plants to be operated by private contractors, as was done during the war, and the enactment of the necessary legislation has been recommended. However, he added, PAD believes that government construction should be confined to facilities for production of products for which there will be little or no peacetime demand, and that loans should be confined to similar situations.

Meanwhile, it is understood that action on pending applications for certificates of necessity has been suspended while Administrator Oscar L. Chapman seeks a formula which will encourage the construction of facilities needed for the defense program but will provide no tax advantages for plants projected prior to Korea to meet civilian demand.

Gas Shortage Seen

Delays in deliveries of line pipe threaten East

WASHINGTON.—Defense production in the industrial East may be seriously handicapped next winter by a shortage of natural gas, the extent of which will depend upon the ability of transporting companies to get line pipe for expansion projects now under way.

Given all the equipment needed, the shortage on peak days can be held to around 250,000 M.c.f.; but delays in pipe deliveries which now appear inevitable could raise the deficiency to as high as 1,00,000 M.c.f. Since industrial consumers are on an interruptible basis, a shortage of anywhere near the maximum would result in complete shutdown of plants dependent solely for natural gas and a possible deficiency of supplies for domestic and commercial consumers.

Deliveries delayed.—The situation was touched upon last month by Deputy Petroleum Administrator Bruce K. Brown in an address before the Texas Independent Producers and Royalty Owners Association in which he disclosed that production of line pipe in the fourth quarter of last year was 40 per cent below the average for the two preceding quarters and is believed to have slipped further in the first quarter of 1951.

The result has been that delivery dates of the mills for this year have been moved back from 3 to 12 months, and PAD has urged the National Production Authority to take action to see that production is kept at at least the current rate and to work out with the oil agency a procedure for allocating deliveries for pipe lines on the basis of essentiality.

Vicious circle.—Any shortage of gas supply due to lack of pipe would lead

to further shortages in pipe production because the steel industry is one of the largest users of natural gas and would be among the first to lose its supply if curtailment became necessary. This, in turn, would cut into the production of steel and still further reduce the supplies available to the pipe mills.

In a report on the oil and gas industry's steel requirements last year, a National Petroleum Council committee estimated that 3,256,000 tons of large-diameter line pipe (16 in. or greater) would be required for 1951 operations. Total line pipe production was in excess of 950,000 tons a quarter last summer, but is believed now to be down to 700,000 tons or less.

MRO Clarified

Provisions don't apply in case of operator requiring a small amount of capital equipment to drill oil, gas wells

WASHINGTON. — MRO provisions of the tubular-goods Order M-46 do not apply in the case of an operator requiring a small amount of capital equipment to drill an oil or gas well, because the well is considered a complete operation costing more than the $1,000 maximum of the MRO provisions, it was explained this week by the Petroleum Administration.

Similarly, PAD said in a statement clarifying the order, MRO does not include the installation of pumping or lifting equipment, but parts for such equipment may be secured when installation or replacement of the entire assembly is not involved.

Clearing up questions about application of the order to transportation and storage, PAD said MRO material is provided for pipe-line terminals and all other terminals for crude oil or products.

Marine equipment. — MRO material is also available for marine equipment, such as barges, tugs, launches, or converted LST's, used in connection with production operations, refining, pipe lines, or marketing, but MRO for tankers, power barges, tugs, and other similar equipment when operated under the supervision of the Maritime Commission, Navy, or other government agency, must be secured under NPA Regulation 4, the general MRO order.

Similarly, MRO material is provided for railroad rolling stock, including locomotives and tank cars, owned or leased by the operator if used on his premises, and in petroleum industry operations, and is not under the jurisdiction of the Defense Transportation Administration.

PAD emphasized that application of a DO rating to a delivery order does not guarantee delivery in all instances, as for example, where a supplier does not have the material in stock and cannot get it by extending the rating.

Blanket orders. — PAD will approve blanket orders for MRO material providing for monthly deliveries over a period of 1 year in certain cases where monthly requirements are constant and where a price advantage is gained by placing a blanket order.

It was also explained that any person engaged exclusively in rendering a service to operators, such as oil-well cementing, dehydration, well surveying, perforating, shooting, acidizing, and the like, may use the provisions of M-46.

Drill pipe or tubing will not be obtainable under the MRO provisions, but wire drilling line, casing, and sand lines and the like will be if the material to be replaced is unfit for further service within the definition of maintenance and repair.

Three routes.—Three ways are provided to enable an operator to obtain an item of capital equipment, such as a portable welding machine or portable tank unit: (1) by using the DO Rating 97 under the provisions of Section 2 (F) where the item is worn out and unfit for further service and a replacement is required; (2) by using the DO-97 rating under Provisions 2 (FO) (W) where a new capital item is required and the complete operation of which it becomes a part costs $1,000 or less; or (3) by applying for assistance under Section 13 where the two previous methods are not applicable.

Parts.—Component parts for containers, such as drum closures, gaskets, flange covers, lids, bails, etc., are considered operating supplies obtainable under the MRO procedure when the parts are purchased separately.

Deferment List Revised

A revised list of essential activities was issued this week by Secretary of Commerce Charles Sawyer for the guidance of the Defense Department in calling reservists to active duty and for the information of Selective Service in determining draft deferments.

All activities in the fields of oil exploration and drilling, oil and gas production, and petroleum refining are included in the list as essential to the defense program and to minimum civilian health, safety, and interest, and as necessitating maintenance or increase of the current level of employment.

The revisions were recommended by a joint commerce-labor committee with the approval of an interagency-advisory group on which the Interior Department was represented. The committee is now working on a revision of the list of critical occupations.

NPA Issues Control Orders

WASHINGTON.—The following orders have been issued by the National Production Authority:

Schedule 1 to Order M-45, March 31: Providing for the allocation of naphthenic acid.

Order M-51, March 31: Prohibiting new designs in glass containers.

Order M-52, March 31: Reducing the percentages of molybdenum which may be used in certain stainless steels.

Amendment to Order M-14, March 31: Adding to the list of items in which nickel may not be used after April 15.

Amendment to Order M-8, April 2: Permitting suppliers of tin or tin products to acquire a normal resale inventory by anticipating receipt of buyers' end-use certificates.

Amendment to Order M-12, March 31: Relaxing the restrictions on use of copper parts for certain products.

Amendment to Order M-38, April 3: Limiting consumers of lead to 100 per cent of their rate of use during the first 6 months of 1950.

Amendment to Order M-25, April 6: Reducing the quotas of tin for cans for certain products and establishing a preference system for deliveries of cans by manufacturers unable to fill all orders.

Ceiling Price Regulation 17, April 5, by Office of Price Stabilization: Establishing ceilings on oil products for refiners and other sellers below the retail level.

Tank-Car Output Reduced

WASHINGTON.—Mounting demands for steel for other defense-supporting programs will necessitate a reduction in May of the allocation for the construction and repair of freight and tank cars, the National Production Authority disclosed last week.

The cut in the allocation to 288,500 tons from the 310,000 tons a month earmarked for the first 4 months of the year is expected to reduce the output of new cars from 10,000 to 9,000 a month of all types.

Just what effect the reduced steel supply will actually have on production is not yet clear. So far, the car builders have not approached the 10,000 units a month which were programmed, output in January having been only 5,949 cars.

Troubles Ahead

Shortages, changes, problems, face all branches of the industry in coming months, PAD men say on road tour

George Weber

HOUSTON.—In the opening session of a 5-day swing through the country, a group of top Petroleum Administration for Defense officials this week told 300 Houston oil men of the industry's problems and of the means the agency is taking to solve them.

Heading the group was A. P. Frame, assistant deputy administrator in charge of domestic-petroleum operations. Frame outlined the administrative setup of PAD and explained its position with regard to the industry and to higher government bureaus.

Frank Watts, director of the materials division, commanded most attention, since his subject covered steel. He explained the present squeeze being put on the oil industry but said that it would relax steadily barring a greatly increased military program or prolonged strikes.

It was evident from his remarks that the goal of 43,400 wells this year would not be reached if operators depended entirely on steel allocations for their casing, tubing, and drill-pipe needs.

Oil-country tubular goods necessary for the 43,400 wells programed for this year would require mill production averaging 157,500 tons per month, he said. March production was 131,000 tons and 140,600 tons are expected each for April and May. The declining production of the recent past will continue to be offset somewhat with expected June production of perhaps 154,600 tons. By July they hope the rate of 157,500 can be reached. Meanwhile operators must continue so far as possible drilling at the present high rate, averaging 48,000 wells per year using tubular goods out of inventory where possible, and resorting to second-hand materials and even employing lighter line pipe in shallow wells.

Industry has "knowhow."—The drilling industry has the rigs, knowhow, and other facilities to drill more than 52,000 wells this year, Watts said, if tubular goods were available. He strongly urged those who could to continue the present high drilling rate, while PAD expended every effort to keep steel goods out of the black market. If PAD were able to meet all requests for pipe listed in industry applications to date, he said, operators presumably would be drilling 72,000 to 75,000 wells this year.

TEL warning.—Reid Brazell, director of refining, repeated the warning that tetraethyl lead is going to have to stretch much further in the future until the stockpile is built. This year avgas requirements will be double those of last year. This fact, plus the expected 12 per cent increase in motor-fuel production this year and an anticipated decline of 15 per cent in TEL available for motor fuels, all adds up to decreasing octane numbers, lower than those being marketed today in most cases.

Target date. — The target date for bringing reserve inventory of TEL up to the required amount is sometime during the first quarter of 1953. This assumes TEL production continuing at about the present level through 1952. This is by no means assured even with new TEL capacity due for completion next year he warned, because raw materials — particularly ethyl chloride and metallic sodium— are in short supply. Serious lead shortages are indicated also, and PAD is trying to obtain exceptions to substantial government cuts in lead allocations to TEL producers.

Octane rating.—In case TEL production is not sustained, motor-fuel octane will have to drop further. On the other hand, if TEL production improves, the stockpile will be built faster and TEL restrictions may be taken off or modified sooner. One thing is certain, said Brazell: The stockpile will be built no matter what happens.

Sulfur shortage.—Thomas L. Apjohn, assistant director of refining, reviewed the avgas and jet-fuel situation and touched on the growing problem of sulfur shortages. Avgas-production rates are now satisfactory, he said, for the short-term situation, but the long-term picture was not good. The estimated requirements for this year, made last January, have been revised upward. Production is still below the average required for this year as a whole, but current needs are being met.

The improved transport situation for moving butanes and butylenes to existing alkylation units, plus bottleneck removal in operating plants and reactivation of standby facilities, will bring production up to satisfactory levels this year.

Long-range picture. — The longer-range picture is less optimistic, however. Since it takes 18 months to build an alkylation plant, now is the time to start such construction, he said. The extended alkylation program involves a problem in financing. Refiners cannot be expected to invest heavily in such specialty processes without some aid. Such help in the form of long-term contracts for production seems the best solution and the expansion program is generally awaiting the granting of such contracts by the military.

Tied into the alkylation situation is the sulfur shortage, since not only the sulfuric acid process uses that chemical but sulfuric acid is needed in synthesizing hydrofluoric acid the other alkylation catalyst employed by refiners. Refiners, both large and small, were urged to consider installing facilities which would improve sulfuric acid regeneration and recover sulfur from sour crude and sour gas. Apjohn estimated that a profit was indicated for sulfur-recovery plants with capacity as small as 25 tons of elemental sulfur daily.

Jet fuels. — On jet fuels, Apjohn stated that second-half requirements for this year would be 20 per cent higher than for first-half needs, with a total yearly demand estimated in the neighborhood of 12,500,000 bbl. This demand will run about 20 per cent JP1 and 80 per cent JP3 types. New specifications are coming for JP3 and the proposed new JP4 fuel will show a vapor pressure of 2 to 3 lb. This lower vapor pressure is required by the military because of the excessive losses due to evaporation and slugging in certain cases where jet aircraft climb rapidly from warm fields. The A.P.I. gravity for the new specification will probably range from 40° to 63°.

Transportation.—W. P. Hayes, assistant director of supply and transportation, reviewed the situation on crude and products movements. Transportation expansion is badly needed all along the line, he said. Crude-pipe-line capacity east of the Rockies will be up 400,000 bbl. per day by the end of this year and products pipe-line capacity will jump about 100,000 bbl. per day with more lines due to be completed next year. Barge builders are seriously delayed on schedules. Of 12,300 tank cars on order, only 265 were built in January and 194 in February. Fifty-eight million barrels of storage was added last year and PAD would like to see 80 million erected this year. However, only 14 million was added the first quarter and only enough steel is allocated for 40 million for the full year, so PAD is asking NPA for more tank steel. The industry won't be in an easy position next winter as regards distribution and it will take all the efforts PAD and industry can muster to avoid spot shortages. The problem will remain beyond next winter, Hayes said.

Equipment Answers

Expanded programs, reduced supplies create problem, but fair treatment to industry promised by PAD officials

Dahl M. Duff

COLUMBUS.—Some of the confusion in the minds of eastern operators over current pipe and equipment priorities was cleared up here last week by two officials of the Petroleum Administration for Defense in a question-and-answer session at the annual spring meeting of the American Petroleum Institute's eastern production district.

The Washington representatives were Millard Neptune, assistant director of the production division of PAD, and H. R. Hansen, assistant director of the materials division. Much of the discussion dealt with interpretations of the current petroleum-industry Order M-46.

Increased drilling.—The tremendous unfilled demand in the industry for tubular goods was clearly shown in figures cited by Neptune. He said he had sampled third-quarter programs submitted to PAD by 33 of the country's 56 largest producing companies. These operators propose:

To drill 30 per cent more wells and 35 per cent more footage than last year, to go 4 per cent deeper, and to use 46 per cent more pipe tonnage, 12 per cent more tonnage per well, and 8 per cent more tonnage per thousand feet. Just how these expanded programs will be fitted into the reduced supply of tubular goods is a question now being studied in Washington, Neptune said.

"I can assure you it will not be a matter of caprice or whim," he said. "They will ge given across-the-board treatment. The only selective feature will be in the consideration of an operator's existing inventory position."

The industry, Neptune said, is entering this emergency on a somewhat different basis in this respect than under PAW in the last war. PAD does not plan to question technical validity of the drilling program, itself. "The only measure will be the operator's willingness to spend his dollars," he said. "We won't try to second-guess company geologists."

Low-down on pipe.—Even in 1952, the prospect of any substantially improved supply of pipe appears unlikely. Hansen said it is doubtful whether the increased steel capacity will offset the increased take of the defense program. "Another angle is that in the third quarter the mills are loaded to theoretical capacity, and I don't know of any planning expansion for oil-country tubular goods," Hansen said. "There is, however, this ray of hope: that if the steel does become available, every mill can produce above capacity."

Since many of the eastern group represent gas producers and transporters with line-pipe problems, the two PAD officials were closely questioned as to the procedure and prospects of obtaining this type of pipe. Hansen explained that at the present time the National Production Authority does not recognize the need for priorities for supplies other than for maintenance and repair. "As conditions worsen," he said, "systems will be set up for line pipe and other capital items."

Under present MRO ratings line pipe can be obtained in two ways: one for replacement of corroded or damaged pipe no longer fit for use, or secondly if the entire line can be replaced for $1,000 or less. Hansen pointed out that a line definitely a part of a complete drilling operation costs more than $1,000 and hence is ineligible.

Outside of this MRO provision, the only other assistance on line pipe—or other capital goods for that matter—is the limited aid under Section 13 of M-46. This calls for an application to Washington and a statement of facts showing how the project is related to the defense effort. Hansen said operators using this section should make their applications as strong as possible so that PAD will have an appropriate case to present to NPA. Action under Section 13 is possible now without waiting for the over-all tubular-goods allocations in the third quarter.

MRO questions.—Questions asked at the forum also indicated some misunderstanding of the use of MRO ratings when the item in question is not charged on the company books as maintenance or repair. He said MRO orders are defined in M-46 and are not related to accounting practice. Another point made by Hansen was that the recently distributed PAD Form 25 was in the nature of a questionnaire by PAD to find out what was in prospect and that it should not be construed as an application.

Several at the meeting asked how they would maintain the level of supplies in their own company warehouses, particularly in view of the fact that suppliers are demanding DO ratings. Generally speaking at the present time, Hansen said, equipment manufacturers should not ask for ratings except for MRO materials. If the items are purely capital equipment not for replacement, there is no provision for assistance at this time except under Section 13.

Other facts.—Other information developed during the discussion included the following:

Regarding the possibility of well-spacing regulations, PAD hopes and believes it will not be necessary to impose any end-use restrictions in the production phase of the industry, Neptune said.

On DO-97 orders requiring approval in Washington, PAD is now trying to clear these out within 24 hours, Hansen said. There are still some bottlenecks but it is hoped to eliminate these soon.

PAD, of course, has knowledge of the import of tubular goods from foreign countries, and, Neptune pointed out that R. G. Lawton, director of the PAD production division, has said that, in order to encourage tubular-goods imports, an operator's inventory of foreign pipe would not be counted against him.

In handling the third-quarter allocations, a portion will be held back and not distributed initially. This will be for justified supplementary applications. No formal procedure for appeal from the decisions of PAD has been set up, but the agency's door in Washington is always open for suggestions or complaints, Neptune said.

Purposely Order M-46 goes somewhat beyond the classification of strictly repair, maintenance, and op-

Appearing on the materials-regulation forum at the eastern A.P.I. production meeting at Columbus were R. B. Anderson, Columbian Carbon Co., Charleston, W. Va., discussion chairman; Millard Neptune, assistant director of the production division, PAD; and H. R. Hansen, assistant director of PAD's materials division.

erating supplies, Hansen said. Capital goods can be given the rating provided they are replacing an item worn out and unfit for further service. It need not have been under maintenance on the operator's books.

Furthermore, if the worn-out unserviceable item has been superceded by a later model, it is permissible to obtain this newer type. This was not possible under Regulation 4, but M-46 has liberalized the MRO category. On the other hand, to illustrate what cannot be obtained under the general less-than-$1,000 classification set up in M-46, Hansen cited the example of tongs for a well which in themselves cost less than $1,000. However, he said they would be a part of the complete drilling operation which is above the $1,000 limit.

The materials forum was a highlight of the Eastern A.P.I. meeting. Like other PAD officials, Neptune and Hansen both are former industry men, Neptune going to PAD from Continental Oil Co., and Hansen from Superior Oil Corp.

Expansion "Orgy"

Price regulation is cause of tremendous increase in gas use without regard to its economic value, Crocker says

COLUMBUS. — Government regulation of utility natural-gas prices is responsible for the "present orgy of tremendous expansion in the use of one of our great national resources without regard for its true economic value."

It would be better to have "a lessening in demand with a consequent improvement in the long-range picture," Stuart M. Crocker, president of Columbia Gas System, Inc., told the American Petroleum Institute eastern production district meeting here last week.

Utility regulation has held natural-gas prices far below those of the competing fuels of oil and gas, Crocker said, and "with the present price situation we are finding it impossible to keep demands under control."

More pipe needed.—Unless additional pipe and other necessary material are obtained and greater supplies of gas brought into the Appalachian area before next winter, the Columbia System president said the situation from the standpoint of peak-day deliveries may be serious. In spite of restrictions on gas installations, demands will continue to increase.

"We in Columbia would like to stabilize our volume of business at its present level until the many pre.ent uncertainties are cleared up, but obviously this cannot be done," he said. "The demands for fuel are increasing and must be met. Keeping in mind the present emergency and the conservation of critical materials, if fuel demands can best be met with natural gas, permission must be granted to construct the necessary facilities. If they can be best met with oil, or for that matter, coal, then the natural-gas facilities should not now be constructed."

New officers of the Eastern District, A.P.I. Division of Production: seated—Jack Cashell, Preston Oil Co., Columbus, vice chairman; E. T. Heck, Quaker State Oil Refining Co., Bradford, Pa., new district chairman; Marshall Joy, Brazos Oil & Gas Co., Roscommon, Mich., vice chairman; standing—Ken Cottingham, Ohio Fuel Gas Co., Columbus, new advisory-committee chairman; R. L. Bird, Columbian Carbon Co., Charleston, W. Va., and E. E. Roth, Columbia Engineering Co., New York, both vice chairmen. Not shown are the other vice chairmen, R. W. French, Sohio Petroleum Co., Cleveland; John T. Galey, Pittsburgh Independent; Paul Benedum, Hiawatha Oil Co., Pittsburgh; and T. C. Stauffer, Sun Oil Co., Evansville, Ind.

Technical papers.—Southeastern Ohio operators have tried many methods for the prevention and removal of paraffin in wells, but the proper use of cut commercial paraffin solvents has proved successful and economical and will continue to grow in importance in the area, John C. Wright, Wiser Oil Co., Sisterville, W. Va., told the meeting. He reported on a series of laboratory experiments which he said indicate asphaltic material in the oil is ultimately tied up with paraffin formation and accumulation. Further studies should be made of this possibility. As for solvent treatment, he recommended that a regular schedule using the proper amount be carefully followed.

Many persons, even within the industry, fail to recognize that in northern and central Pennsylvania there are three distinct zones now under investigation, according to S. H. Cathcart, director of the Pennsylvania Topographic and Geologic Survey, who reviewed recent developments in exploration in his state. Prospecting and development continues in the old, established "shallow" oil and gas sands of western Pennsylvania. Another effort has to do principally with finding gas in the Oriskany in the Plateau region. The third is the exploration of the pre-Oriskany of the Ridge and Valley province of central Pennsylvania. Two deep tests are now being drilled in the Ridge and Valley area. All this exploration is stimulated by a good market and a 25 to 30 cent well-head gas price.

Pressure variation.—Though the trend each year in Bradford field has been toward use of higher water-flood injection pressures, there is considerable variation in pressure in other water floods, John F. Buckwalter, Ryder-Scott Co., Bradford, said in a paper on "Selection of Pressure for Water-Flooding Various Reservoirs." He listed the considerations for arriving at proper flooding pressure for a new field, and said the additional cost of higher pressure is not great and that it is set against benefits derived from wider spacing, shorter operating time, additional production, quicker release of equipment, and other advantages in certain areas.

Another paper on this same general subject was that given by John C. Calhoun, Jr., Pennsylvania State College, on the effect of pressure gradients on oil recovery by water flooding. He said it appears there is insufficient comprehension of the waterflooding process to permit general conclusions on the effect of pressure gradients and that it is likely any general conclusions brought forth will apply differently to oil-wet and water-wet systems. Furthermore, he said, the magnitude of effects due to

pressure gradient are not so great as effects due to other variables and thus may be overshadowed.

Increased flooding pressures.—E. T. Heck, chief geologist, and J. C. Vaughan, petroleum engineer, Quaker State Oil Refining Corp., Bradford, reported on field results from increased flooding pressures. They said that if further tests substantiate their study there is strong evidence to believe higher pressure gradients will result in higher ultimate recovery of oil to any given water-oil ratio.

Most of the water floods in the limestone reservoirs of Illinois and Kentucky have been more or less salvage propositions, and as such, may have served their purpose, said Kenneth Huffman, petroleum consultant, Owensboro, Ky., in a paper on these operations. However, there are indications considerable water-flood potentialities were overlooked and relatively large water-flood reserves not recovered.

Citations awarded.—Following the plan being carried out at the other four A.P.I. production district meetings, the eastern group awarded engraved citations to 18 former chairmen at the banquet during the Columbus meeting. A new committee and special study group on natural-gas operating practices was organized in the eastern district under the chairmanship of J. G. Montgomery, United Natural Gas Co., Oil City, Pa. The group will work on technical and physical characteristics of gas production.

Production Record Set

Crude-oil production set an all-time high in the United States when output for the first time exceeded 6,000,000 bbl. daily last week.

Daily average production increased 88,325 bbl. over the previous week to reach 6,056,625 bbl. for the week ended April 7. Most of the gain occurred in Texas, where production soared 108,825 bbl. to 2,725,375 bbl. daily, a new record for that state.

Two other states also set production records: New Mexico increased 2,850 bbl. to 143,850 bbl., and Wyoming 300 bbl. to a total of 197,500 bbl. daily.

Other production included: Indiana, up 2,400 bbl. to 29,600 bbl.; Appalachian fields, up 950 bbl. to 59,000 bbl.; Kansas, down 10,950 bbl. to 311,950 bbl.; Illinois, down 7,900 bbl. to 157,500 bbl.; Oklahoma, down 2,600 bbl. to 492,000 bbl.; Michigan, down 1,900 bbl. to 39,300 bbl.; and Mississippi, down 1,050 bbl. to 97,550 bbl.

Research Firm Formed

NEW YORK.—Sinclair Research Laboratories, Inc., has been organized as a wholly owned subsidiary of Sinclair Oil Corp. to take over all research activities of the Sinclair companies, including the extensive laboratories at Harvey, Ill.

P. C. Spencer, president of the parent company, said the new corporation was created to expand the use of Sinclair's research facilities and skilled personnel in the interest of further technological advancement.

Elected as officers of Sinclair Research Laboratories, Inc., were: E. W. Isom, chairman of the board; P. C. Spencer, president; W. M. Flowers, executive vice president; and E. C. Herthel, vice president. Named as directors were W. R. Argyle, W. M. Flowers, E. C. Herthel, E. L. Hughes, E. W. Isom, T. B. Kimball, W. H. Morris, H. L. Phillips, and P. C. Spencer.

SOUTHWEST

Refining Increase Urgent

Unless 700,000 bbl. daily of new capacity is added by end of 1952, shortages will plague public, PAD head says

George Weber

SAN ANTONIO.—Unless approximately 700,000 bbl. a day of new refining capacity is added by the end of 1952, the public may again be plagued with product shortages of the type that threatened in the immediate postwar period.

This statement by Bruce K. Brown, deputy administrator for the Petroleum Administration for Defense, addressing the Western Petroleum Refiners Association last week, was based on a projection of the upward trend in peacetime civilian demand plus the anticipated impacts of mobilization (not war) demand for military products.

But that is just the beginning, Brown said. By the end of 1953, come peace or war, the industry must add another 300,000 bbl. to daily refining capacity, and by 1956 total capacity should be 1,600,000 bbl. per day higher than the present level of about 6,900,000 bbl. a day.

"Basic" capacity.—Further, the above figures pertain only to "basic" refining capacity, or crude-charging capacity. Superimposed is the added need for new catalytic cracking and reforming, alkylation, and other secondary-process units which will raise the national capacity for producing aviation gasoline, benzene, jet fuels, etc.

"In considering how the expansion should be accomplished," Brown told the refiners, "we started with the basis that the desired increase should be achieved without the execution by Government of contracts to purchase ordinary petroleum products to be refined in these new facilities and without using taxpayers' money in loans that would be regarded as unsound by a private banker or by the Reconstrution Finance Corp. Noting the past history of refinery expansion, we observed that so long as the industry had the market-expectancy and the expectancy of being able to recapture the funds invested in the form of a reasonable 'pay-out' on its investment, it had, in the past, always attended to its own problems and met its own responsibility to the public.

"So long as the necessary basic refining capacity is constructed by private enterprise with its own money and its own legitimate borrowing capacity or credit, we can count on usual business prudence being exercised by such enterprises."

Certificates.—In order to make it possible for refiners to reach these high goals, PAD is recommending to the Defense Production Administration that certificates be issued permitting the acceleration of the normal period of depreciation of the cost of new refining equipment to the 5-year period permitted under the law. These recommendations which have been uniformly accepted by DPA, have been for amounts less than 100 per cent of the cost of the new equipment, Brown said. In the case of basic refining equipment, a figure of 75 per cent has been used.

Good start.—The PAD deputy administrator stated that basic refining projects already approved from the standpoint of tax certification will call for a $318,000,000 investment of private funds and will carry 370,000 bbl. per day to crude-refining capacity in this country.

PAD hopes the nation's refiners will respond to the need for building the additional 630,000 bbl. per day basic capacity by the end of 1953, under the accelerated - depreciation plan. Unless and until that body is convinced that this necessary expansion of 1,000,000 bbl. per day in basic capacity cannot be accomplished by normal methods, it will not recommend special loans under the provisions of the Defense Production Act. Such defense loans will be recommended where necessary, to build the equipment required for turning out special military products. Should Congress so provide, he stated, PAD may recommend government-owned plants for such production.

Alkylation improvements.—Numerous

postwar improvements in sulfuric acid alkylation were outlined by J. W. Jewell, Jr., and C. C. King, M. W. Kellogg Co., New York. In discussing the economics of the new Kellogg reactor embodying internal-emulsion circulation and autorefrigeration, the authors cited the advantages which catalytic cracking and naphtha-processing facilities in the same refinery, plus availability of extraneous natural gasoline, offer the alkylation operator in the form of a flexible source of olefins and isobutane feed stock.

The combination of alkylation with polymerization was discussed at some length, and the minimized investment costs and materially lower operating costs of this combination of processes were outlined.

New acid-recovery process.—A promise of relief for the alkylation-unit operator plagued with the current sulfuric acid problem was held out by the authors, who announced that Kellogg will shortly offer the industry a new, more-economical process for reconstituting spent sulfuric acid. This process, adaptable to small-scale operation, created special interest in view of the problems which face sulfuric acid-alkylation operators in obtaining sufficient catalyst. At another session during the 3-day meeting, however, refiners were told that sulfuric acid for the important alkylation operation would be allocated, but that its use in less critical operations would have to be curtailed.

Registration at the thirty-ninth annual meeting exceeded 800. The association directors voted to return to San Antonio for the fourth consecutive year, for the fortieth annual meeting next spring.

Petrochem participation.—Limited participation in the burgeoning petrochemical industry was held a possibility for the small independent refiner, in cooperation with the established chemical companies and chemical affiliates of oil companies. The prominent part which small refiners have taken in the adoption of Platforming, for example, was cited by George Weber, the Journal's refining editor, as a factor which might bring this class of refiners into the petrochemical picture as producers of much-needed benzene, toluene, and xylenes.

Petrochemical production was evaluated in terms of three basic products: the olefins, benzene, and synthetic anhydrous ammonia. Estimated production of these basics from all sources reached about 5 billion pounds in 1950, and an increase to roughly 8.9 billion pounds was forecast for the year 1955. The share of petroleum and natural gas in contributing raw materials to these and other petrochemical basics is much greater than the 78 per cent increase projected for the next 5 years, Weber said.

Pure chemicals.—In general, while petroleum sources for synthetic-chemical manufacture are showing rapid gains, it was conceded that the pure-chemical companies will continue to play an important part in the industry, although oil-company participation is increasing. The statistical analysis of petrochemicals was discussed with emphasis on the difficulty of obtaining factual net production figures on petrochemical as a total class.

Sulfur recovery.—Much interest was shown in the possibility of small refiners entering the field of sulfur recovery from sour crudes. In another session of the meeting, Reid Brazell, director of PAD's refining division, had asked refiners' cooperation in considering the possibilities of engaging in such sulfur-recovery projects, in cooperation with other refiners or gasoline-plant operators. A consensus indicated that improved techniques for making small-scale operations of this type were needed, and that the likely reduction of minimum economic plant sizes would be forthcoming and would allow a broader base of participation in this much-needed operation.

Small Refineries

They have big place in fuels plan, Brazell says

SAN ANTONIO.—The small refinery has a big place in military-fuels program though the chief problem at the moment is to step up the production of aviation gasoline from larger plants which have alkylation facilities, Reid Brazell, director of the refining division of the Petroleum Administration for Defense, told the W.P.R.A. meeting.

As yet, alkylation units are far too expensive for the small refiners to consider building, but the small refiner is the one hope for causing the cost of alkylation units to be reduced sufficiently to permit economical peacetime operation, he said, just as economical small catalytic crackers have been developed since the war which fit into the pocketbook and operations of small plants.

"The interest of the small refiner in catalytic reforming has already made itself apparent," Brazell said. "As the number of basic processes of this type increase, it can be anticipated that this interest will grow tremendously. The catalytic reformer will also have a high economic value in the postemergency period, since it affords an excellent mechanism for the small refiner to make high-octane gasoline fully competitive in quality."

Special products.—In the meantime, Brazell said, small refineries without such facilities can contribute as they did during the war by producing butylene polymer and other feed stocks for alkylation, high-quality base stock for aviation gasoline, and other intermediate products for further processing into petroleum war products.

As jet-fuel demands increase, the small refiner can play an increasingly important part in supplying military requirements, he said, though he added that changes in specifications now under consideration by the military may make it more difficult for smaller plants to meet requirements of vapor pressure and end point.

TEL warning.—Small refiners were given a special warning by Brazell on the use of the tetraethyl lead allocated to them by PAD. The regulation permits a refiner to use 30 per cent of his annual quota during any one quarter, and Brazell said that indications are that many refiners are planning to use the maximum during each of the first three-quarters of the year, which would leave only 10 per cent for the fourth quarter.

"I want to make it very plain to all refiners that when the total allocation is used, that's all there is," Brazell said. "PAD obviously cannot, in fairness to others, recognize a hardship request which is submitted because a refiner used 100 per cent of his allocation in less than 12 months."

He explained that while additional TEL facilities will be completed next year, present plants are unable to operate at capacity now because of shortages of various raw materials, and added:

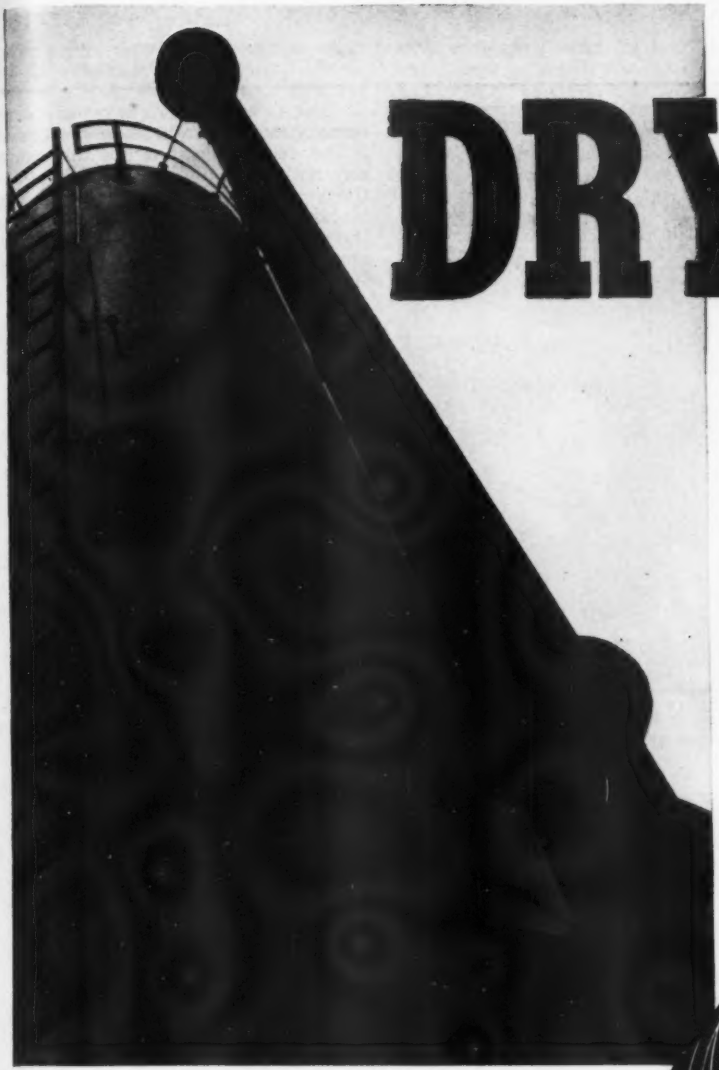
"With production of gasoline increasing, and with sharply increased demands for military aviation gasoline in prospect, the amount of TEL available to the refiner per gallon of gasoline produced is certain to be considerably smaller in the future than it has been in the past.

"This all adds up to one thing: The octane number of automotive gasolines will have to be reduced in future months."

Gas-Price Increase Asked

MARSHALL, Tex.—Application has been made to Price Stabilization Board by Arkansas-Louisiana Gas Co., Shreveport, for approval of a 7-cent per 1,000 cu. ft. price at the outlet side of its Waskom and Jefferson field refineries. This is the second price rise requested within a year by the company and is 2 cents higher than the previous price and double the original price of 3½ cents.

Spokesmen for the company said the proposed increase would extend to all Arkansas-Louisiana leases in the two fields bringing prices into line with those in effect on other leases.



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GULF COAST

Tung trees frame the rig over George Vasen's deep test in Mississippi where visitors are obviously not welcome.

"Mystery" Well

Mississippi wildcat within 85 ft. of new world's record depth; operator may test further or complete as gasser

Leigh S. McCaslin, Jr.

WIGGINS, Miss.—The rank wildcat of George Vasen, 3 miles east of this small town, is now within 85 ft. of a new world depth record and indications are that the operator plans to test or complete it soon.

This is about the only definite information which could be obtained by a first-hand visit to this "mystery" well this week. It has been drilled as a completely "tight" hole.

New Orleans and Houston oil circles have been buzzing with all kinds of rumors since the well blew out early in March *(The Oil and Gas Journal, March 8, page 50)*. Since then the well has been drilled another 298 ft., giving it a total depth at present of 20,436 ft.—slightly shy of Superior Oil Co.'s record holder in Wyoming.

Considerable difficulty is being encountered keeping the mud in proper condition because of the high pressure of gas encountered.

Unique conditions. — When the well was visited this week it was circulating in order to bring up the mud weight. Operators would not say whether they plan to drill ahead, test, or set pipe. Vasen has said that he has a special string of 7,000 ft. of stainless pipe on order for the production string. This would go on the bottom end of the string, with regular pipe for the upper 14,000 ft.

Vasen is also reported to have said that a temperature survey will be run on the well this week and also a bottom-hole-pressure test will be taken. A log will be run as soon as casing is set.

It has also been reported that a special christmas tree is being assembled for completing the well and that tests are under way to determine what problems may be encountered in cementing pipe at 20,000 ft.

Geologists watching. — New rumors were started Thursday when a group of top-ranking geologists of Gulf Oil Corp. visited the well. Gulf has been one of the few major companies which have given any support to the venture. Union Producing Co. and Atlantic Refining Co. have made a contribution in order to have access to cores on the test.

A great amount of geological information should be available at such time as the operator chooses to release it. The well has been diamond cored continuously since 14,450 ft., but the cores have been kept locked up. A Gulf geologist has been on the floor when cores were pulled, and two geologists from the U. S. Geological Survey have been in constant attendance for some months.

The recent blowout did not cause any noticeable upsurge in leasing activity around the well because no big blocks of acreage are available in the area. Vasen has said that he and another person control a block of 400,000 acres surrounding the well.

Equipment.—Curiosity in oil circles is not confined to the geology of the well. People are wondering what kind of drilling equipment and practices have been employed. From Journal observation, the steam rig on the job is designed for 10,000 to 12,000-ft. drilling. The derrick is 800,000-lb. test and 136 ft. high—ample for the job. The primary reason Vasen has been able to drill so deep with so little equipment is because he has diamond-cored the hole, as high mud-circulation rates are not necessary for diamond coring. By rigging up 10 drilling lines it has been easy to take the drill-pipe load, but an estimated load of 400,000 lb. was on the draw works when 7-in. casing was set at 14,038 ft.

There will be considerable interest when and if Vasen allows his toolpusher, R. E. Scheutte, to discuss operating practices used on the well.

The Stone County wildcat is expected to set the world's depth record this week. Operator is coring below 20,440 ft., and according to Tom McKinney, drilling superintendent, the well will probably be drilled an additional 250 ft. from present depth.

MID-CONTINENT

Carter Appointment

John W. Brice is named new chairman of board

JOHN W. BRICE, a member of the board of directors of Standard Oil Co. (N. J.), New York City, has been elected to the newly created position of chairman of the board of directors of Carter Oil Co., Tulsa.

The new office was established to aid in the formulation of long-range plans and broad corporate policies, O. C. Schorp, president, and who continues as chief executive officer of the company, reported. Brice's appointment becomes effective June 8.

A former Carter executive vice president and director, Brice has had a 24-year background of experience in the oil industry with Jersey and its affiliates since his graduation from University of Texas in 1927.

Started as geologist.—He began work in Texas as a field geologist for Humble Oil & Refining Co., and in 1931 went to Venezuela as a geologist for Creole Petroleum Corp. Eight years

later he was named assistant manager of the Venezuelan company.

Brice first joined Carter in 1942 as a director and vice president in charge of exploration. He became ex-

JOHN W. BRICE

ecutive vice president in 1943, and 2 years later was moved to the Jersey company in New York City as assistant coordinator of producing, later becoming coordinator. He was named to the Jersey board of directors in 1949.

Successor named.—Standard of New Jersey announced that Lloyd W. Elliott has been designated as a nominee for election as a member of the board of directors of that firm, filling the post to be vacated by Brice. Elliott's nomination will be voted upon at the annual shareholders' meeting June 8. He has been president of Standard-Vacuum Oil Co. since 1946.

Probe Narrowed

FPC to decide if Phillips is a natural-gas company

BARTLESVILLE, Okla. — The Federal Power Commission's investigation of the natural-gas activities of Phillips Petroleum Co. has been narrowed to the single issue of whether or not Phillips is "a natural-gas company" within the meaning of the Natural Gas Act.

When the hearings opened here April 3 *(The Oil and Gas Journal, April 5, 1951, page 63)* the investigation was scheduled to include also an inquiry into the reasonableness of the rates charged by Phillips for gas gathered and delivered to Michigan-Wisconsin Pipe Line Co.

However, Edward A. Marsh, FPC trial examiner who is conducting the hearing, announced that the commission had amended the order to confine it to the question of jurisdiction only. This rule was protested by Lambert McAllister, assistant general counsel of FPC, who is in charge of presenting evidence on behalf of the commission. He objected that he could not proceed with the hearing with the case limited in this fashion, but Marsh advised him to continue. A number of documents bearing on the rate question were tentatively introduced for identification, subject to later rulings on their admissibility as evidence.

Intervenors protest.—This limiting of the case also drew protests from intervenors representing consumer interests. In Madison, Gov. Walter Kohler of Wisconsin protested to President Truman and asked a reversal of the commission's ruling, saying that action on the price of gas handled by the Michigan-Wisconsin line is essential to consumers in his state.

During the first week of the hearings FPC counsel examined a number of Phillips officials and presented many contracts and other documents to establish the scope of Phillips' gas business and the methods in which it operates. This is proving to be a slow process, and indications are that the hearings will continue for several weeks.

Observers pointed out that the question of jurisdiction, the only matter before the commission at present, is the first essential to any other action, and would have had to be decided first even if the hearing record included data on reasonableness of Phillips' charges. Phillips contends that it functions only as an independent producer and gatherer of natural gas and as such is exempt from FPC jurisdiction by express provision of the Natural Gas Act.

NORTHWEST

North Dakota Strike

Amerada's rank wildcat in Williston basin flows 350 bbl. daily, spurs leasing frenzy in heretofore oilless state

Philip C. Ingalls

FIRST commercial oil production in North Dakota was found last week by Amerada Petroleum Corp. at its deep wildcat in the heart of the Williston basin.

The well flowed high-gravity oil at a rate of at least 350 bbl. daily on a 17-hour production test. The wildcat is now shut in, awaiting erection of tankage for additional testing.

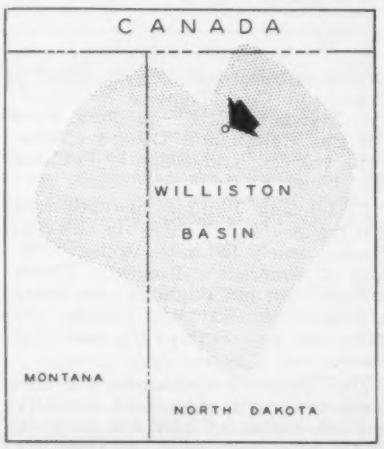
The strike was no great surprise to many geologists, as evidenced by leasing activities that had gobbled up large blocks throughout most of the state. Some reports say 78 per cent, or 35,000,000 acres, of the state is now under lease.

Localized prospects were recognized back in the early twenties, but it was not until 1939 that the over-all potentialities of the state began to attract attention. When Alberta's Leduc was brought in in February 1947, leasing activities in North Dakota, which lies in the same sedimentary unit, reached boom proportions and have continued to the present. Amerada's announcement gave additional impetus that had 2,000 lease buyers converged on the town of Minot within 24 hours.

Performance. — The new producer, the 1 Clarence Iverson, CSW SW 6-115n-95w, 9 miles from Tioga, in Williams County, flowed 307 bbl. of 53°-55°-gravity oil in 17 hours through a ¾-in. choke from perforations at 11,630-60 ft. opposite a limestone believed to be of Devonian age which had been treated with 4,000 gal. of acid. A later gage was a flow of 159 bbl. of the same high-gravity oil in 13 hours through the choke. Both tests indicated a gas flow of 5 to 6 million cubic feet daily.

The ultimate commercial value of America's strike can be determined only after production history on the discovery well and additional wells on the drilled structure has been established. However, the discovery's performance to date indicates that despite the depth of the hole and acid requirements of the formation that a commercial pool has been tapped.

True wildcat.—Amerada's well is a truly rank wildcat. Nearest oil production of significance in Canada is about 500 miles northwest, in Montana 400 miles west, in northwest Wyoming,



Location of Amerada Petroleum Corp. 1 Clarence Iverson.

over 300 miles southwest, and in western Nebraska, 450 miles south. There has been no significant production developed to the east of this well west of Michigan and Illinois.

Amerada located its 1 Iverson after 2 years of intensive seismic work in the area of the long-known Nesson anticline *(see page 137, this issue)*. The wildcat is located about 6 miles north and east of a dry hole dug to 10,281 ft. by The California Co. about 13 years ago. Amerada believes that its well is right on the crest of the anticline on the basis of the company's seismic work in the area.

Lease activity.—Amerada has 250,000 acres under lease in an area around the Nesson anticline. North of Amerada's holdings are concentrations held by The Texas Co. and Superior Oil Co. of California.

Other companies holding large concentrations of acreage in North Dakota are Stanolind Oil & Gas Co., Shell Oil Co., Carter Oil Co., Union Oil Co. of California with Wilshire

Deep Test Planned

Williston basin interest last week was shared with the staking of a deep exploratory test in southern Saskatchewan on the northeast limb of the basin.

A new 8,000-ft. rig will be moved in immediately to drill a deep test 14 miles from Watrous for the Sohio group.

The Sohio group is one of the largest permit and lease holders now operating in the dominion, with 8,819,872 acres of Crown lands under permit, and 1,600,000 acres of freehold privately owned) lands under lease.

Associated with Sohio in the venture are Texas Gulf Producing Co., Union Sulphur & Oil Corp., The Chicago Corp., Republic Natural Gas Co., Midstates Oil Corp., and Bradley Producing Corp.

Oil Co. and Hancock Oil Co., Phillips Petroleum Co., Magnolia Petroleum Co., Standard Oil Co. of Ohio, Pure Oil Co., Continental Oil Co., Plymouth Oil Co., and Atlantic Refining Co.

Carter and Phillips currently are drilling a "tight" hole in Morton County nearly 150 miles to the southeast of Amerada's discovery. Union of California and Magnolia have made a location in Cavalier County 190 miles east and north of the new producer.

The Union of California-Wilshire-Hancock group announced recently the acquisition of 2,000,000 acres in 12,000 individual leases and plans for the drilling of six exploratory wells in the sparsely tested state.

INTERNATIONAL

MIDDLE EAST

Concession Revision

I.P.C. makes offer to Iraq Government which is expected eventually to lead to full government sharing in profits

Dahl M. Duff

IRAQ PETROLEUM CO., LTD., has made a new concession-revision offer to the Iraq Government which is expected eventually to lead to full government sharing in the company's profits.

A government communique from Baghdad said I.P.C. had agreed to increase the government's share from oil revenue to levels prevailing in other Persian Gulf countries. It was understood that negotiations to work out details would be opened the latter part of the month.

The Iraqis are reported seeking a new agreement along the lines of that signed in December by Arabian American Oil Co. and the Saudi Arabian Government which provided government sharing of revenue up to a maximum of 50 per cent, including royalties and other taxes. Only a preliminary approach has been made to the Iraq Government thus far, and no exact degree of profit sharing agreed on, according to sources in New York.

H. S. Gibson, managing director of I.P.C., was scheduled to return to London the middle of this week from Baghdad where he has been in contact with the Iraq officials. It appeared that the new agreement to be negotiated on the basis of the new I.P.C. offer would supersede the 50 per cent royalty increase offered by the company last August and likely would also cover the separate concessions held by the two I.P.C. associated companies operating in Iraq, Mosul Petroleum Co., Ltd., and Basrah Petroleum Co., Ltd.

August agreement. — The agreement of last August provided an increase from four to six gold shillings per ton in royalty (to the equivalent of about 34 cents, including payment in lieu of taxes). The Basrah and Mosul companies, required to begin commercial production in 1952 and 1953, respectively, have concession contracts providing unusually high government payments amounting to 20 per cent in kind plus four shillings gold per ton on the remainder.

Complicated problem.—The Iraq problem is complicated by the question of payment on the free or the official rate of gold. All indications are that the Iraqis will continue to insist on payment on the free-market rate, which varies up to 40 per cent or more of the official rate. The August agreement provided that the Iraqis would sue the company in Britain on this issue, but it is expected to be worked into some over-all settlement.

A minority group in the Iraq Parliament asked for nationalization of the oil industry shortly after the Iranian Parliament voted to take such action against Anglo-Iranian Oil Co., Ltd. The premier's statement said that higher royalty, increased oil production, and the completion of the government's refinery project "would fully guarantee the Iraq national interests and there will be no need for nationalization. But if the oil companies do not yield to these demands, the present government will be free to take all necessary measures, including abolition of existing concessions."

Iraq's present production of about 165,000 bbl. daily comes almost wholly at present from Kirkuk field, operated by I.P.C. Two of I.P.C.'s associated companies, Mosul Petroleum Co., Ltd., and Basrah Petroleum Co., Ltd., have shut-in production. The Basrah company is expected to begin commercial production early next year. A further step-up in Iraq's output will result from the completion of the 30-32-in. line now under construction from Kirkuk to Tripoli.

Saudi Arabia safe. — In California, R. G. Follis, board chairman of Standard Oil Co. of California, described as "excellent" relations between King Ibn Saud of Saudi Arabia and Arabian American Oil Co., in which his company holds a 30 per cent interest.

Follis, just back from a 5-week air trip around the world, said there is no parallel between the situations in Saudi Arabia and Iraq and Iran. In Saudi Arabia, he said, "I found an atmosphere of good will toward the Americans. The renegotiation of the concession has brought about a great deal of satisfaction. . . . In effect, the Saudi Arabian government is now equal partners with Aramco, without putting up the capital."

Kuwait Output Drops

Production of crude oil in Kuwait during February dropped 63,213 bbl. daily to 358,779 bbl. daily, Kuwait Oil Co. figures show. Total production for the month was 1,357,540 tons, or 10,045,833 bbl.

Middle East Airing

British officials discuss situation with U. S. State Department; American oil men offer to manage Iran oil

A GROUP of British officials arrived in Washington this week for consultation with the State Department on the situation in the Middle East.

The talks are planned primarily to review prevailing political conditions, but such discussions inevitably must include petroleum. The presence of Victor Butler, undersecretary of the Ministry of Fuel and Power indicated that the Iran situation will be brought up.

Reports have reached Washington that some American oil men have made offers to the Iranian Government to take over the management of the British oil concession, but officials said they have nothing concrete to back up these rumors. They said any such move would be premature since there is reason to hope that some satisfactory solution will be worked out.

There are indications, however, that the current Anglo - American talks will cover the possibility of an interruption of Iranian shipments and the steps that may be necessary as a result. Such an interruption would take some 100,000 bbl. of crude and maybe 450,000 bbl. or more of refined products out of the world daily supply, leaving a gap which would be extremely difficult to fill. Most of the burden would fall upon the American oil industry, since there is little supply elsewhere of such products as kerosine for India.

In addition to Butler, British officials scheduled to take part in the top-level talks were Ambassador Sir Oliver Franks, Geoffrey Furlonge, head of the Foreign Office's eastern department, and R. D. Serpell of the treasury. A Foreign Office spokesman in London said the strategic importance of Iran and its petroleum industry would be uppermost at the conferences.

U. S. view.—Reports from London as well as Washington are that the U. S. State Department is convinced nationalization in Iran is now an accomplished fact that cannot be reversed and that the department is urging the British to make the best arrangement possible with the Iranians. There was talk of a United States loan enabling the Iranians to run the industry and keep it out of the hands of the Russians.

On the other hand, some State Department officials declared there is no foundation for the report that this government is urging acceptance of nationalization. They said the discussions would go into ways and means of keeping Iranian oil moving to the democratic countries even if nationalization goes into effect, explaining that the United States has no fixed position in the matter and the talks are purely informal and exploratory.

The recent developments in Iran appeared to make construction of the Middle East Pipeline, Ltd., 34-36-in. line from Iran and Kuwait to the eastern Mediterranean more remote than ever. The project has been in abeyance because of the refusal of the Iraqis to grant right-of-way. It was learned C. L. Lockett, general manager of M.E.P.L., has returned to Standard Oil Co. (N. J.) and become shareholders' representative in Cairo. This change and closing of the New York office of the pipe-line company, however, occurred shortly before the nationalization turmoil in Iran.

This pipe line was intended to facilitate supply of Iranian oil to Socony - Vacuum and Jersey Standard under their long-term contracts with Anglo - Iranian. Jersey Standard is scheduled to begin liftings of its share with the opening of the Fawley refinery, originally scheduled for July but now reported to have been delayed a month or two. Iranian crude is important to Socony-Vacuum and Jersey Standard, and their joint subsidiary, Standard-Vacuum Oil Co., meets a major part of its Far East requirements from the Abadan refinery, under a recently renewed contract

Protest rejected. — The British Government's protest note to Iran over the Anglo-Iranian nationalization was rejected over the week-end by the Iranian Government. The Iranian premier, Hussein Ala, told the British Government it had no right to interfere in dealings between his government and a business concern.

Strikers dwindle. — The number of striking Anglo-Iranian workers was reported early this week to have dwindled to about 5,000 from a peak of 11,000 to 12,000 idle earlier. The only major interference to company operations was a reduction of about 20 per cent in loadings at Bandar Mashur.

EUROPE

Big Congress

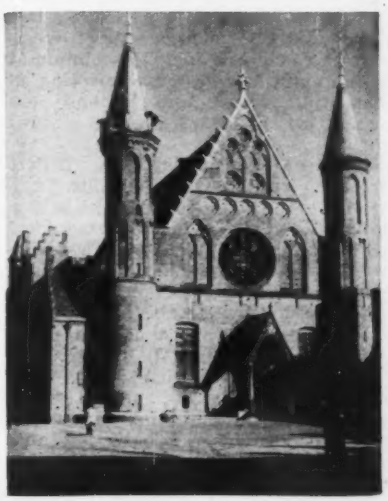
1,300 already registered for international meeting

CABLED advice from the press service section of the World Petroleum Congress to the Journal indicates a heavy preregistration, with the number planning to attend having reached the 1,300 mark at this advanced date. The cable to the Journal from The Hague also reports that 300 of those registered are planning to bring their wives to the 10-day sessions. The Congress committee has arranged special tours and excursions to points of interest for attendees' wives.

There are over 200 technical papers in exploration, drilling, production, natural gas, refining, transportation scheduled for the forthcoming sessions at The Hague.

Journal tour.—The Oil and Gas Journal has made special arrangements with Pan American World Airways and American Express Co. for an escorted tour which will include all accommodations round-trip from New York to Amsterdam, all hotel reservations, etc., and with brief visits to Brussels, Paris, and London after the meeting. A special Pan American plane flight, designated "The Oil and Gas Journal Special," will leave New York's international airport at 10:00 a.m., May 25. Reservations and ticket sales for the trip are being handled through American Express Co., 1409 Commerce Street, Dallas, by American Express District Manager Frank W. Erickson.

Complete date schedule and itinerary for the Journal's special World Petroleum Congress tour via Pan American Airways and American Express can be found in the March 1, 1951, issue, page 32, and March 15, page 55.



Plenary opening session of Third World Petroleum Congress will be held at the historical Hall of the Knights (Ridderzaal), The Hague. Sectional meetings during the 10-day program cover all technical developments in every branch of the petroleum industry.

PERSONALS

W.P.R.A. Head

R. L. Tollett elected at San Antonio meeting

R. L. TOLLETT, president of Cosden Petroleum Corp., Big Spring, Tex., was elected president of Western Petroleum Refiners Association at the organization's annual meeting in San Antonio last week He has been active in the association for several years.

A native of Temple, Okla., Tollett spent his youth in Wichita Falls, Tex., where his father was engaged in the oil business, and when he graduated from high school went to work as a roustabout and teamster in Burkburnett field. In 1925 he started in the refining division of the oil industry when he joined the old American refinery at Wichita Falls in 1925.

Working at American as a stenographer during his early days of employment, he continued studies in night school, where he took law and accounting. He was admitted to the bar in 1932, and a year later passed an examination for certified public accountant.

Joining Cosden in July 1939 as a vice president, Tollett was named president of the company less than a year later. Before joining Cosden he varied his experience in the oil industry by serving as a special agent for the Federal Bureau of Investigation, Washington, D. C.

He is a member of the American Institute of Accountants.

Earl W. Olson has been placed in charge of production at the new district office of The Texas Co. at Sterling, Ill. **E. G. Griffith** will be chief geologist, and **G. A. Nelson,** assistant geologist.

A. B. Brown has been promoted from vice president in charge of production to general manager of Richmond Exploration Co. with headquarters in Maracaibo, Venezuela. He replaces **Norman Hardy** who has been transferred to Saudi Arabia as executive assistant to **Fred Davies,** senior executive officer for Arabian American Oil Co.

William May has joined Santa Fe Drilling Co. and has been assigned to operations in eastern Venezuela.

Floyd H. Miller, Jr., production geologist for Gulf Oil Corp., Goldsmith, Tex., has been transferred to Midland, Tex., as exploration geologist.

James D. Elder, geologist at Wichita for Cooperative Refinery Association, has been transferred to Oklahoma City as district geologist.

Dr. Frank C. Fowler, formerly senior process engineer in the chemical-products department of Phillips Petroleum Co., Bartlesville, Okla., and with the University of Oklahoma faculty since 1946, has joined Midwest Research Institute, Kansas City, as petroleum consultant. He will conduct research investigations in petroleum and allied fields for the institute.

Robert L. Kidd, vice president and manager of the land and geological division of Cities Service Oil Co., Bartlesville, Okla., has been appointed assistant to the president. In addition to his new duties, he will continue his work in oil exploration and development. Kidd, who is also a director of the firm, has been with the company for more than 25 years. He started as a development geologist at Madison, Kans., was named manager of the land and geological division in 1945, and elected vice president 3 years later.

Stanley C. Frank, formerly engineer for Stanolind Oil & Gas Co., has joined Tellepson Construction Co. at Houston as project engineer in the petrochemical division.

W. S. Jackson, engineer at Houston, has been transferred to Shreveport as supervisor of field engineering for Brown & Root, Inc.

Don A. Miller, formerly head of Phillips Petroleum Co.'s western division, has been placed in charge of company's new regional office established at Midland, Tex. **M. R. Hayes,** formerly assistant division superintendent at Midland, Tex., will succeed Miller as western division superintendent. **D. A. Chase,** formerly superintendent of the firm's West Texas district, has been appointed to succeed Hayes as assistant division superintendent. **A. W. Mallow,** formerly district superintendent of Phillips' East Texas district at New London, Tex., replaces Chase as West Texas district superintendent, and **Sid Walker** succeeds Mallow as superintendent of the East Texas district.

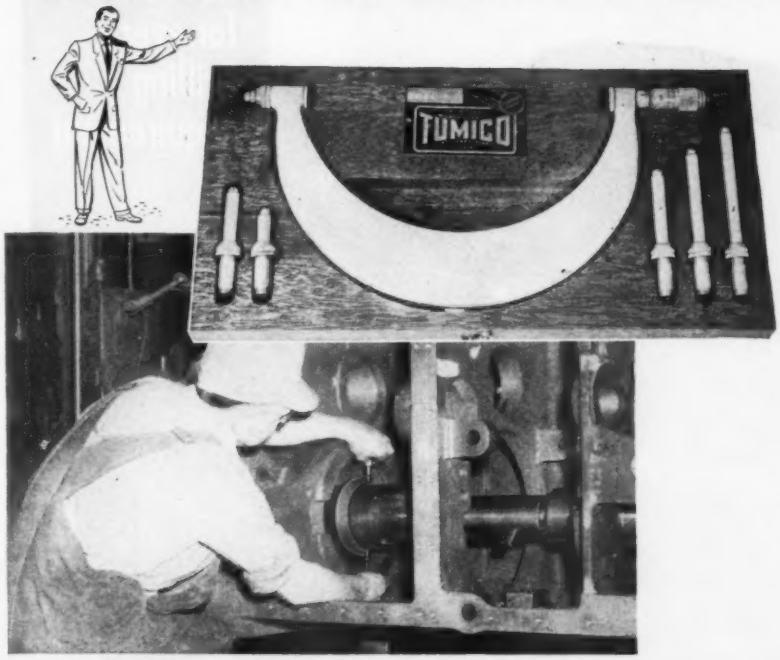
Stephen R. McGavran, assistant engineer for General Petroleum Corp., has been appointed production engineer for the San Joaquin division of the firm's producing department. He joined the firm in 1948 immediately following his graduation from the University of Southern California.

H. G. Wesberry, Tide Water Associated Oil Co., has been transferred from Hobbs, N. M., to Midland, Tex., where he will be assistant superintendent for the West Texas division.

C. R. Adams, gas mechanical engineer for Shell Oil Co. at Houston, has been transferred to Midland, Tex., as area gas engineer. Other changes in the firm include: **J. A. Connors,** division mechanical engineer at Wasson, Tex., to Hobbs, N. M.; **M. J. Edwardson,** junior exploitation engineer at Odessa, Tex., to Houston; **F. Falcon,** regional production geologist at Houston, to division production geologist at Hobbs; **T. B. Lambert,** division reservoir engineer to division exploitation engineer at Odessa; **E. D. Manly,** division exploitation engineer at Wasson, to Hobbs; **L. P. Miller,** junior exploitation engineer at Houston, to exploitation engineer at Odessa; **A. K. Palmer, Jr.,** division exploitation engineer at Wasson, to Hobbs; **C. L. Rabe,** area exploitation engineer at Midland, to Houston; **R. W. Russell,** division exploitation engineer at Wasson, to Hobbs; **J. D. Savage,** regional exploitation engineer at Houston, to division exploitation engineer at Midland; and **J. V. Vogel,** junior mechanical engineer at Midland, to New Orleans.

William H. Bowman, Max Neuhaus, and **L. P. Scoville** have been elected vice presidents of Jefferson Chemical Co., Inc. Neuhaus, who joined the firm when it was first organized by The Texas Co. and American Cyanamid Co., had previously been with Texaco and Texaco Development Corp. since 1932. Prior to joining Jefferson, Scoville had been with Texaco for 12 years. Bowman joined the firm as market-development manager in 1945.

Get Fast, Accurate Bore Measurement



WITH THE TUMICO OVER-THE-BAR MICROMETER

The Tumico Over-the-bar micrometer makes speedy bore diameter measurements without removing the boring bar or disturbing cutter settings. Light-weight hollow steel frame makes precision measurements easy . . . gives the "feather touch" needed for extreme accuracy! Made in 11 models ranging from 3″ to 28″, Tumico Over-the-bar micrometers are fully and easily adjustable for wear.

All Tumico micrometers, gages and measuring instruments include advance design principles to measure diameters to 96″. Skilled engineering has reduced weights up to 50%. "Feather touch" feel and balance speeds measurements and insures accuracy.

Tumico instruments control production for many of America's largest manufacturers. Consult us for special production gages, calipers, alignment instruments, etc. Catalog sent free on request.

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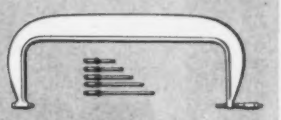
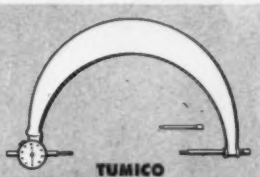
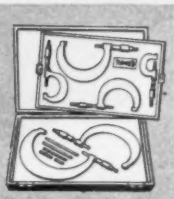
PRECISION MEASURING INSTRUMENTS



TUMICO BAR MICROMETERS
Provide a wide range of precision measurement with low investment. 30 models from 6″ to 168″.

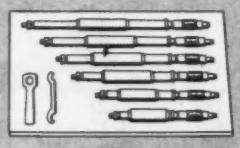


TUMICO DIAL INDICATOR GAGES
Quick vision Tumico micrometers and gages to meet your special measurement requirements.

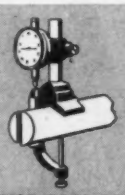


TUMICO MICROMETER SETS
Complete sets for a broad range of accurate measurement operations. From 0″ to 30″ in 1″ steps.

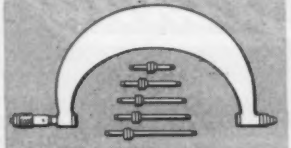
TUMICO VERNIER CALIPERS
Precision made. Accurate, clearly etched graduations and numerals. 24 models from 6″ to 48″.



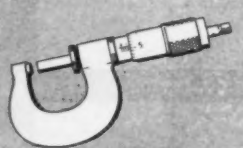
TUMICO INSIDE MICROMETERS
Tubular construction; insulated from hand heat for full precision. 37 models from 1″ to 106″.



TUMICO POST GAGES
Precision micrometer or dial indicator instruments adaptable to a wide variety of uses. 10 models.



TUMICO OVER-THE-BAR MICROMETERS
Precision bore measurement without removing boring bar. 11 models from 3″ to 28″.



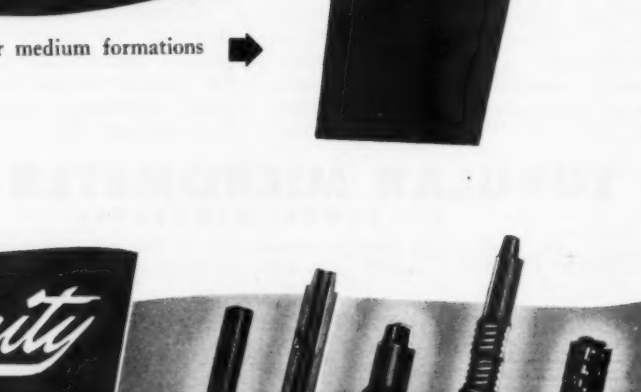
TUMICO HEAVY-DUTY MICROMETERS
Extra rugged for hard usage under severe conditions. 4 models from 0″ to 4″.

There is a Security Rock Bit for every Drilling Requirement

For soft or medium formations

Security

ROCK BITS • REAMERS • CORING BITS • HOLE OPENERS • CASING SCRAPERS • SECURALOY



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Main Office: Whittier, California
Branches in all major producing areas
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XUM

PERSONALS

Forrest D. Wimbish, assistant district geologist for Magnolia Petroleum Co., has been transferred to Wichita as district geologist for Kansas replacing the late Patrick Philbrick.

W. A. Clark, Jr., Houston, independent operator; **R. L. Denham,** Humble Oil & Refining Co.; and **M. M. Sheets,** Production Maintenance Co., also of Houston, have been elected by the Houston Geological Society as official 1951-53 representatives to the American Association of Petroleum Geologists.

Earl Sam Marie, consulting geologist, has joined American Republics Corp., at Houston as senior geologist.

Irving J. Staid has been appointed manager of the manufacturing department for Carter Oil Co. at Billings, Mont., and **Herman G. Gunter** has been appointed assistant manager of the manufacturing department. Staid joined Esso Standard Oil Co. as a chemist in 1938 after graduating

I. J. STAID

H. G. GUNTER

from University of Alabama. He joined Carter in 1945 as chief engineer of the Billings refinery, and in 1946 was made assistant manager of the firm's manufacturing department. Gunter joined Standard Oil Co. (N. J.) in 1930 after graduating from Johns Hopkins University. After serving in several Jersey refineries he joined Carter in 1947 and has been general superintendent in charge of operations at Billings since completion of the plant there.

Harold T. Johnson, Jr., has joined the staff of John S. Harold, Inc., consulting geologist firm in New York. He was formerly oil editor of the Wall Street Journal.

S. B. Irelan, president of Cities Service Gas Co., has been appointed to serve on the Gas Industry Advisory Council working in cooperation with Interior Secretary Oscar Chapman.

Reese H. Tucker, chief geologist for Cities Service Oil Co., Bartlesville, Okla., has been appointed manager of the land-geological division, succeeding **Robert L. Kidd.** Tucker joined

***NEW OFFICERS.**—Officers elected at the sixth annual meeting of the Illinois Oil and Gas Association at Mount Vernon, Ill., seated, left to right, are: A. L. Henderson, Ohio Oil Co., first vice president; F. A. Calvert, Jr., Calvert Drilling, Inc., president; and Basil Moss, Magnolia Petroleum Co., third vice president. Standing, left to right: Edward W. Harrington, Wiser Oil Co., treasurer; M. H. Plummer, Pure Oil Co., secretary; Clarence T. Smith, independent producer, general counsel; and John E. Miller, executive secretary. Not shown in the picture is C. Richard Collins, Collins Brothers Oil Co., second vice president.*

the firm in 1930 as a junior engineer, and in 1948 was appointed manager of the geophysical department. The following year he was named chief geologist for the firm.

Lee R. Forker, assistant secretary and federal purchasing agent for Quaker State Oil Refining Corp., Oil City, Pa., will be appointed shortly as a temporary consultant to the Economic Cooperation Administration. He will be a member of an American team which will visit western European Marshall-plan countries to advise private firms on how to package their goods in a better method. His tour of duty with ECA is to last 3 months.

Arno C. Fieldner, associated with the Bureau of Mines since it was organized in 1910, has been named chief fuels technologist. He will serve as adviser, technical specialist, and general authority on scientific problems in fuels technology. **Louis C. McCabe,** assistant chief of the fuels and explosives division, has been promoted to chief. McCabe joined the bureau for a year in 1946, and returned in July 1949.

Donald T. Mast, petroleum engineer at Beeville, Tex., for Union Producing Co., has been transferred to Shreveport as district petroleum engineer. He joined United Gas Corp. in 1940, and was an assistant engineer in the Beeville district office when he entered military service in 1941. He returned to the Beeville office as petroleum engineer after his discharge in 1946.

W. S. Crake, chief mechanical engineer in the Houston area for Shell Oil Co., and **O. L. Odale,** division engineer for East Texas division, Kilgore, Tex., have exchanged positions. Other Shell changes include: **R. P. Moscrip,** senior mechanical engineer, to Midland, Tex., as chief mechanical engineer; **J. R. Christian,** junior exploitation engineer, from Houston to Hobbs, N. M., as exploitation engineer; **R. E. Farmer,** junior geologist, from Houston to Midland as subsurface geologist; **C. A. Hull,** division production superintendent at Odessa, Tex., appointed acting division production manager; **W. G. Inabnet,** district superintendent, from Wasson to Odessa, Tex., as acting division production superintendent; **E. L. Kimrey,** general superintendent, from Midland to Hobbs as division production manager; **W. J. Quevreaux,** mechanical engineer, from Houston to Odessa in a similar capacity; **J. W. Roach,** junior geologist, from Houston to Midland as subsurface geologist; **L. O. Storm,** district exploitation engineer at Hobbs, promoted to division exploitation engineer; **G. J. Anderson,** exploitation engineer, from Eagle Lake, Tex., to Houston; **H. W. Barnes,** junior exploitation engineer, from Houston to Franklin, La., as exploitation engineer; **W. N. Crawford, III,** exploitation engineer, from Donaldsville, La., to Delta district; **G. G. Dixon,** scout, from Jackson, Miss., to Lake Charles, La.; **H. L. Haag,** scout, from Lake Charles to New Orleans; **J. H. Loeb,** junior exploitation engineer, from Houston to Franklin as exploitation engineer; **J. P. Moore,** exploitation engineer, from Franklin to

XUM

PERSONALS

W.P.R.A. OFFICIALS.—Newly elected officers and directors of Western Petroleum Refiners Association elected at San Antonio last week. Left to right, front row: J. W. Warner, Tide Water Associated Oil Co., Tulsa; H. T. Ashton, Socony-Vacuum Oil Co., Inc., St. Louis; F. L. Martin, Sunray Oil Corp., Tulsa; R. L. Tollett, Cosden Petroleum Corp., Big Spring, Tex., president; R. W. McDowell, Mid-Continent Petroleum Corp., Tulsa; J. W. Vaiden, Skelly Oil Co., Tulsa; W. J. Carthaus, Deep Rock Oil Corp., Tulsa; F. H. Dunn, Wilcox Oil Co., Tulsa. Back row, left to right: Reid Brazell, Leonard Refineries, Inc., Alma, Mich.; L. D. Mann, Cities Service Refining Corp., Lake Charles, La.; Fayette B. Dow, W.P.R.A., Washington, D. C.; R. R. Irwin, Socony-Vacuum Oil Co., Inc., Kansas City, Mo.; John C. Day, W.P.R.A., Tulsa; J. P. Langfitt, Pure Oil Co., Chicago; R. G. Bandy, Midland Cooperative Wholesale, Cushing, Okla.; J. S. Wertz, Vickers Petroleum Co., Inc., Wichita; Lee Haugen, Cities Service Oil Co., Bartlesville, Okla.; Brown L. Meece, Globe Oil & Refining Co., Chicago. H. J. Kennedy, Continental Oil Co., Houston; and Roland V. Rodman, Anderson-Prichard Oil Corp., Oklahoma City, vice presidents, and additional directors elected were not present for the picture.

Donaldsville; and **R. L. Smith,** junior exploitation engineer, from Houston to Donaldsville as exploitation engineer.

Maury M. Travis, consulting geologist at Denver, has joined the Federal Power Commission at Washington, D. C., as geologist.

E. T. Heck, Quaker State Oil Refining Co., Bradford, Pa., has been elected chairman of the eastern district of American Petroleum Institute's Production Division. Vice chairmen elected at the spring meeting at Columbus, Ohio, were: **Marshall Joy,** Brazos Oil Co.; **Paul Benedum,** Hiawatha Oil Co.; **Jack Cashell,** Preston Oil Co.; **R. W. French,** Sohio Petroleum Co.; **John T. Galey,** independent producer; **T. C. Stauffer,** Sun Oil Co.; and **E. E. Roth,** Columbia Engineering Co. **R. L. Bird, Jr.,** Columbian Carbon Co., was elected secretary-treasurer; and **K. C. Cottingham,** Ohio Fuel Gas Co., was elected chairman of the advisory committee.

Howard A. Johnson, district exploitation engineer for Shell Oil Co. at Great Bend, Kans., has been transferred to Oklahoma City as division exploitation engineer.

Herbert F. McCarty has joined **William D. Flynn,** independent producer at Robinson, Ill.

James C. Black has joined Pure Oil Co. as geologist in the Fort Worth office. Other recent newcomers to Pure's geological staff include: **Robert K. Bradley, Harry W. Kugler, Jr.,** and **Carl G. Ulbog,** all at Midland; and **William L. King,** at Wichita Falls, Tex.

E. F. Cole, tool pusher for Humble Oil & Refining Co. at Odessa, Tex., has been transferred to Wink, Tex., in the same capacity.

R. L. Fletcher, president of Providence Gas Co., Providence, R. I., has been appointed chairman of the 1951 American Gas Association Distinguished Service Award Committee.

Brooks Hall, formerly Stanolind Oil & Gas Co. geologist at Billings, Mont., is now operating in the Mid-Continent area with headquarters at Wichita, Kans.

Cecil A. Hamman, formerly with Yingling Oil & Mining Co., has become a petroleum-engineering consultant at Evansville, Ind.

Lennox A. Fitch, formerly with Sohio Petroleum Co., has joined Pan-Am Southern Corp. at Shreveport as assistant manager of the land department.

M. T. Lloyd, formerly managing director of Commonwealth Oil Refineries, Ltd., has been named director of the newly formed Petroleum Information Bureau which is being sponsored by the Australian oil industry. Headquarters of the bureau has been established in Melbourne.

Keith Somerville has joined Brown & Thorp Drilling Co. as geologist at McCamey, Tex. For the past 2 years he has been with Shell Oil Co. at Lake Charles, La.

DEATHS

George Ellsworth Bennett, 87, pioneer Tulsa oil man, died April 8 in Tulsa. He moved to Tulsa in 1907 from Philadelphia where he had been treasurer for Pure Oil Co. He was one of Tulsa's first oil men, working as an independent oil lease broker when he retired.

F. H. Oglesby, pipeline division, Cities Service Gas Co., died March 20 in Winfield, Kans. He had been with the firm since 1925.

I. L. Dunn, 81, formerly with Dunn-Lewis Consulting Petroleum Engineers at Tulsa, died April 9. He organized the firm in 1925 and retired from active work in 1940.

Leslie T. Barber, 65, Michigan oil and gas producer, died March 30 in Edmore, Mich.

John P. McNutt, Sr., 70, partner in McNutt & Davis Drilling Co., died April 4 in Okmulgee, Okla.

Roy R. Poe, 63, president of Reese Drilling Co. and president-general manager of Tiger Mountain Oil Co., died April 4 in Tulsa.

Harry Dewey, 67, veteran oil-field worker, died April 1 in Seminole, Okla.

Melville J. Sayer, 56, district manager for Magnolia Petroleum Co. in Shreveport, died April 1 at Shreveport. He had been with Magnolia for the past 38 years.

Ace Gutowsky, 64, who discovered West Edmond oil field near Oklahoma City, died April 4 in Oklahoma City.

XUM

ANNOUNCEMENT

March 15, 1951

The Institute of Inventive Research

of San Antonio, Texas, is pleased to announce the issuance of U. S. Patent Number 2,545,380, March 13, 1951, covering the more basic features of the

Poulter Method of Seismic Exploration

Employing Elevated Charges

In addition, pending U. S. patent applications include:

Serial No. 11,613 — Feb. 27, 1948 — Air-Firing of Shaped Charges to Produce Directive Seismic Wave.

Serial No. 29,307 — May 26, 1948 — Air-Firing of Charge Pattern to Produce Directive Seismic Wave.

Serial No. 102,824 — July 2, 1949 — Composite Air-Fired Charge for Directing Wave Energy.

Serial No. 102,821 — July 2, 1949 — Controlling Frequency of Seismic Wave set up by Air-Fired Charge Pattern.

Serial No. 102,822 — July 2, 1949 — Controlling Frequency of Seismic Wave set up by Air-Fired Charge Pattern.

Serial No. 102,823 — July 2, 1949 — Controlling Frequency of Seismic Wave set up by Air-Fired Charge Pattern.

Serial No. 113,120 — Aug. 30, 1949 — Controlling Frequency of Seismic Wave Projected to Selected Depths.

Serial No. 218,029 — Mar. 28, 1951 — Procedure Enabling Use of Air-Fired Charges in Refraction Shooting.

(Awaiting Serial Number) — Controlling Frequency of Seismic Wave set up by Air-Fired Charge Pattern.

FOREIGN COUNTRIES

Country and Title—	App. No.	Filed	Pat. No.	Date
Argentine—Seismic Exploration	92,144	10-23-48	75511	4-21-50
Argentine—Method, Apparatus for Seismic Exploration	92,145	10-23-48		
Argentine—Improvement in Seismic Exploration	97,606	11-16-49	76253	6-21-50
Australia—Seismic Exploration	24315/48	11-17-48		
Australia—Method and Apparatus for Seismic Exploration	24316/48	11-17-48		
Australia—Improvement in Seismic Exploration	31,748	12-21-49		
Bahamas—Seismic Exploration	US 11613	11-26-48	146	3-15-49
Bahamas—Method and Apparatus for Seismic Exploration	US 29307	11-25-48	147	3-15-49
Bel. Congo—Improvement in Seismic Exploration	3038	12- 7-49	3038	12-13-49
Bolivia—Improvement in Seismic Exploration		11- 8-49	1236/Ser.B	6-22-50
Brazil—Seismic Exploration	48,366	10-28-48		
Brazil—Method and Apparatus for Seismic Exploration	48,367	10-28-48		
Brazil—Improvement in Seismic Exploration	51,914	11-18-49		
Britain—Seismic Exploration	27,362	10-21-48		
Britain—Method and Apparatus for Seismic Exploration	27,363	10-21-48		
Britain—Improvement in Seismic Exploration	2827-50	2- 3-50		
Canada—Seismic Exploration	580,052	10- 8-48		
Canada—Method and Apparatus for Seismic Exploration	580,051	10- 8-48		
Canada—Improvement in Seismic Exploration	594,189	11-12-49		
Chile—Seismic Exploration	497/48	10-21-48	11,584	4-12-49
Chile—Method and Apparatus for Seismic Exploration	496/48	10-21-48	11,611	4-13-49
Chile—Improvement in Seismic Exploration	483/49	11-17-49		
Colombia—Seismic Exploration	US 11613	10-18-48	4935	7-29-49
Colombia—Method and Apparatus for Seismic Exploration	US 29307	10-18-48	4936	7-29-49
Colombia—Improvement in Seismic Exploration		Dec. '49		
Egypt—Seismic Exploration	US 11613	11- 3-48	2	12-23-48
Egypt—Method and Apparatus for Seismic Exploration	US 29307	11- 3-48	3	12-23-48
Egypt—Improvement in Seismic Exploration	183. 35238	1-10-50		
France—Seismic Exploration	564,913	12-17-48		
France—Method and Apparatus for Seismic Exploration	564,914	12-17-48	977,379	11- 8-50
France—Improvement in Seismic Exploration	580,930	11-17-49		
Guatemala—Improvement in Seismic Exploration		11-16-49		
Holland—Seismic Exploration	144,030	11-24-48		
Holland—Method and Apparatus for Seismic Exploration	144,031	11-24-48		
Holland—Improvement in Seismic Exploration	150,997	1-12-50		
India—Seismic Exploration	40,623	12- 2-48	40,623	8- 2-50
India—Method and Apparatus for Seismic Exploration	40,624	12- 2-48	40,624	11-22-50
India—Improvement in Seismic Exploration	42,443	12-21-49		
Iran—Seismic Exploration	US 11613	10-28-48	1,630	4-17-49
Iran—Method and Apparatus for Seismic Exploration	29307	10-28-48	1,615	4-17-49
Iran—Improvement in Seismic Exploration	B/1205/1405	11-14-49	1,731	6-22-50
Iraq—Seismic Exploration	US 11613	10-30-48	54/400/48	11- 8-48
Iraq—Method and Apparatus for Seismic Exploration	29307	10-30-48	55/400/48	11- 8-48
Iraq—Improvement in Seismic Exploration	76,357/31	11-23-49	68/400/49	11-26-49
Israel—Improvement in Seismic Exploration	5143	12-23-49		
Italy—Improvement in Seismic Exploration	40/93	11-14-49		
Mexico—Seismic Exploration	27,027	1- 5-49		
Mexico—Method and Apparatus for Seismic Exploration	27,026	1- 5-49		
Mexico—Improvement in Seismic Exploration	28,591	11-16-49		
Pakistan—Improvement in Seismic Exploration	1776	12-30-49		
Paraguay—Improvement in Seismic Exploration	766	11-16-49	610	12-17-49
Spain—Method and Apparatus for Seismic Exploration	188,094	5- 5-49	188,094	7-21-49
Spain—Improvement in Seismic Exploration	190,443	11-16-49		
So. Africa—Improvement in Seismic Exploration	2681/49	12- 9-49	9028	5- 8-50
Turkey—Seismic Exploration	7000/48	11-10-48	5280	8- 9-49
Turkey—Method and Apparatus for Seismic Exploration	7001/48	11-10-48	5298	8- 8-49
Turkey—Improvement in Seismic Exploration	6259	11-16-49	5562	4-17-50
Venezuela—Seismic Exploration	US 11613	10-29-48	3971	10-24-49
Venezuela—Method and Apparatus for Seismic Exploration	29307	10-29-48	3913	10-17-49
Venezuela—Improvement in Seismic Exploration		11-16-49	4339	7-29-50

The Institute of Inventive Research, owner of the above listed patents and patent applications, announces their availability for licensing and will provide the accumulated technical data already developed through use of the Poulter Method of Seismic Exploration.

XUM

It's Time to Counterbalance Beam-Pumping Units

Problem: Get the oil but don't install unnecessary pumping capacity.

This requires knowledge of the loads and torques on your installations and making proper counterbalance adjustments. Procedures to aid in these adjustments are given here.

by Douglas O. Johnson*

OVER the period of the last 16 years many articles have been written and formulas have been proposed which had as their purpose a better understanding for the oil producers of the importance of proper counterbalancing of beam-pumping installations.

In the past pumping units were built with extra steel and extra capacity in them so as to offset to a great extent the abuses imposed by improper attention to the adjustment of counterbalance and adjustment of all of the other factors which would tend to minimize peak loads and torques.

At the present time pumping units are being designed with definite ratings to take care of definite peak loads and peak torques, and because of the competitive market the extra "padded" capacity is fast fading out of the picture. This, of course, means that it becomes a necessity to measure the loads and torques to which the pumping units are being subjected. In many instances it does not require very much unbalance to go beyond the rating of the unit.

The present defense effort with the necessary conservation of steel makes it more imperative that pumping units and all equipment be loaded as heavily as practical so as not to use up unnecessary steel.

Simple procedures have been presented by various authors over the past 16 years for the adjustment of counterbalance. These may be enumerated as follows:

1. Recording tachometer.
2. Measurement of belt tension.
3. Slipping of the clutch.
4. Listening to the sound of the prime mover.
5. Indicating ammeter showing peak current used by electric-motor drive.
6. Vacuum-gage readings taken on engines.
7. Measurement of the actual counterbalance effect at the polished rod with dynamometer.

It would be well at this point to have a brief discussion of each of these methods pointing out the advantages and disadvantages:

1. The use of the recording tachometer is a practical method in many instances but it has some very definite limitations. The sensitivity of this method depends upon the amount of flywheel effect present to absorb peak loads on the prime mover. Recordings have been made which show practically no variation in prime-mover speed and yet when the dynamometer card was recorded and the counterbalance weighed, the counterbalance line missed the dynamometer card entirely.

These were cases where the prime mover was lightly loaded and the flywheel effect maintained a constant speed although the degree of unbalance was quite appreciable. This method is also tricky in that it is not always possible to even up the speed variation on the upstroke and downstroke. This results from the complex consideration of the geometry of the pumping unit and the shape of the load characteristics recorded by the dynamometer. Figs. 1, 2, and 3 illustrate the above points.

2. Measurement of belt tension was used chiefly on the large flat belts which were extensively used in the past, but since practically all units now are operated with multiple V-belt drives, there is no practical use being made of this today.

3. Slipping of the clutch is a fairly good method but is not always practical, especially where large rotary weights are being used. Also, this means that the clutch must be in good condition, which may or may not be the case.

4. Using the sound of the prime mover is best suited for electric-motor drives and may or may not be a good method for multicylinder engines, depending on the action of the engine governor and the shape of the dynamometer card.

5. Experience shows that several field men may be sent out with an indicating ammeter and they will come back with different ideas as to whether the well is over or under counterbalanced. In other words, the successful operation depends on the skill of the operator. Equal peak currents on the upstroke and downstroke do not necessarily mean that the well is balanced so as to require minimum power requirements.

6. Experience shows that in relying on vacuum-gage readings on the engine to determine best counterbalance, the result leads to an overbalanced condition. In order to obtain results from this method, an experienced operator would be required, and each type of engine and well condition would need special interpretation.

7. Experience over the last 3 years proves that counterbalancing is best understood by the field men when the counterbalance effect is weighed at the polished rod as a regular procedure in taking dynamometer readings. This method allows an immediate comparison between the counterbalance effect and the maximum and minimum well loads and gives an immediate picture of normal and abnormal load characteristics. It records a quantitative measurement from which the amount of unbalance can quickly be determined. Counterbalance tables may then be consulted and the amount of change necessary can be made at a minimum of time and expense. If the field crew is available to do the work immediately, a check can then be made to see whether the desired amount was ob-

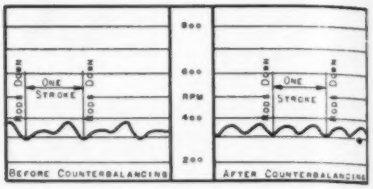


Fig. 1

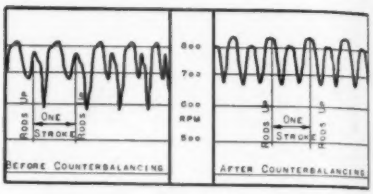


Fig. 2

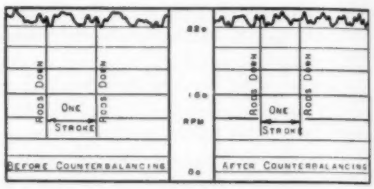


Fig. 3

*Johnson-Fagg Engineering Co., Tulsa. Presented at A.P.I. Division of Production meeting, Amarillo, Tex., March 21-23.

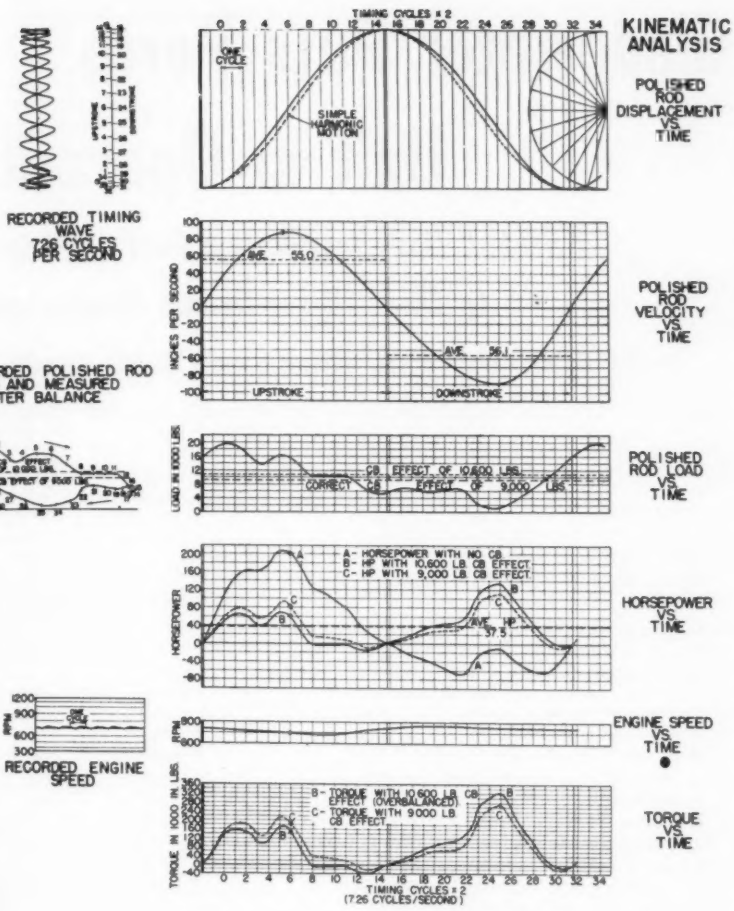

KINEMATIC ANALYSIS
TIMING CYCLES x 2
ONE CYCLE
SIMPLE HARMONIC MOTION
POLISHED ROD DISPLACEMENT VS. TIME
RECORDED TIMING WAVE 726 CYCLES PER SECOND
INCHES PER SECOND
AVE. 55.0
AVE. 36.1
UPSTROKE
DOWNSTROKE
POLISHED ROD VELOCITY VS. TIME
RECORDED POLISHED ROD LOAD AND MEASURED COUNTER BALANCE
LOAD IN 1000 LBS.
CB EFFECT OF 10,600 LBS.
CORRECT CB EFFECT OF 9,000 LBS.
POLISHED ROD LOAD VS. TIME
A- HORSEPOWER WITH NO CB
B- HP WITH 10,600 LB CB EFFECT
C- HP WITH 9,000 LB CB EFFECT
HORSEPOWER
AVE. HP = 37.5
HORSEPOWER VS. TIME
RPM
RECORDED ENGINE SPEED
ENGINE SPEED VS. TIME
TORQUE IN 1000 IN LBS.
B- TORQUE WITH 10,600 LB CB EFFECT (OVERBALANCED)
C- TORQUE WITH 9,000 LB CB EFFECT
TORQUE VS. TIME
TIMING CYCLES x 2
(726 CYCLES/SECOND)

Fig. 4—Kinematic analysis of pumping unit.

tained. On some units the adjustment can be easily made in a few minutes.

When pumping conditions are unstable it is very difficult to select the best counterbalancing for the conditions unless dynamometer cards are taken.

After a pumping installation has been properly counterbalanced—or a better statement would be "counterbalanced as well as it can be under the operating conditions existing"—then there still remains the problem of determining whether the peak-torque rating of the pumping unit is being exceeded. We can assume that the pumping motion is simple harmonic and under these conditions compute the approximate peak torque. However, this does not take into account the actual rig geometry and the variation in prime-mover speed. Kemler[1] has shown how the velocity of the polished rod may be obtained by making a detailed layout of the pumping unit and solving for the instantaneous velocity by means of vectors.

Mills[2] has shown how counterweight and well-load torque may be calculated from the rig geometry and dynamometer-load data. This method also involves the detailed layout of the pumping unit.

If a timing wave is recorded simultaneously with the dynamometer card, the velocity of the polished rod may be computed without any additional measurements. By making a record of the instantaneous prime-mover speed with a recording tachometer, the analysis may be carried far enough to obtain an instantaneous-torque curve.

This type of analysis automatically takes into account the geometry of the pumping unit and the variation in speed of the prime mover.

Kinematic Analysis

The following is the step-by-step procedure in making a kinematic analysis of a pumping unit (see Fig. 4):

The timing wave is made simultaneously with the dynamometer card, but must be placed in the proper position to draw the polished-rod displacement curve, and also so that it may be used to divide the dynamometer card into equal time intervals.

The timing cycles should be numbered, starting at any convenient point, preferably near the start of the upstroke. In order to help in keeping this numbering straight, it has been found convenient to project the points where the timing wave cuts the central axis, taking into account both the full cycles and half cycles. The next step is to choose a convenient horizontal scale, which may be either timing cycles or time in seconds, and carrying the projections across and plotting the displacement vs. time curve. This procedure is shown by the top curve of Fig. 4. As a convenient comparison a simple harmonic curve has also been plotted.

In order to plot the polished-rod velocity curve, the small increments of distance are measured carefully from the original of the timing wave. The ratio of the length of the pumping stroke measured at the polished rod to the over-all length of the timing wave gives the over-all reduction ratio of the recording, and from this may be determined the actual distance the polished rod travels for each increment of time. By knowing the distance and the time elapsed, the average velocity for each increment may be calculated and plotted, and when sufficient points are determined the polished-rod velocity curve is plotted.

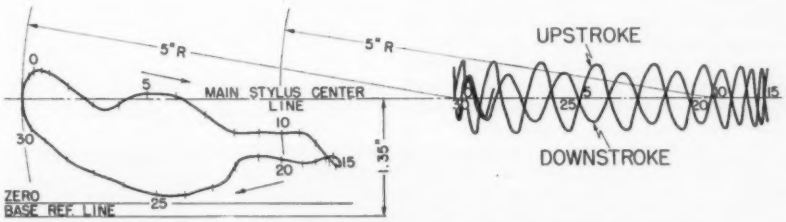


Fig. 5—Procedure for dividing dynamometer card with equal time intervals.

As a check on this procedure the average upstroke and downstroke velocity may be determined by the use of a planimeter, measuring the area contained between the velocity curve and the zero line and then dividing by the length of the zero line to give the average height. This average velocity should check with the average polished-rod velocity determined by counting the strokes per minute with a stop watch.

In order to divide the dynamometer card into equal time intervals, the following procedure should be followed (see Fig. 5):

The center line of the main stylus must be located with reference to the base reference line, and the axis of

(Continued on page 85)

Gladewater Puts Perco Unit in Operation

650-bbl. Daily Installation Part of Program to Meet Higher-Octane Requirements

by H. A. Grebe,* A. L. Miles,† and K. W. Seed‡

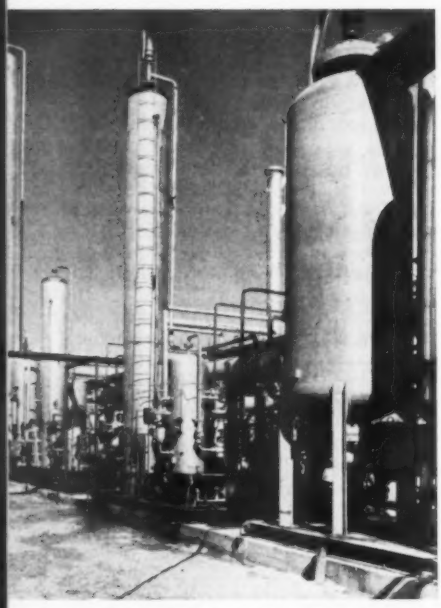


Fig. 1—General view of the new Perco unit at the Gladewater Refining Co.'s plant.

GLADEWATER REFINING CO., Gladewater, Tex., recently placed in operation a Perco Cycloversion unit as part of their modernization program to meet higher-octane requirements. The new installation is designed to process 650 bbl. per stream day of either cracked gasoline, straightrun naphtha, or blends of these two products, Fig. 1.

The complete unit is mounted on three skids with the exception of the three direct-fired heaters; namely, the process heater, the steam superheater, and the debutanizer reboiler. The shop-fabricated assembly was shipped from Houston to Gladewater where a concrete pad approximately 40 ft. long and 8 ft. wide had been prepared as a foundation. There are actually four skids on this pad, three of which are for the Perco unit. On the fourth skid is mounted a stabilizer for thermally cracked gasoline which operates apart from the Perco unit proper and in connection with the thermal cracking and catalytic polymerization units.

Fig. 2, in addition to being a flow diagram of the unit, clearly illustrates the equipment on each skid. As shown in this figure the skids contain the following equipment:

Skid No. 1

1. Two catalyst chambers.
2. Valve manifolding for chamber switching during processing and catalyst regeneration.
3. Finned-tube heat exchangers (which provide heat exchange between catalyst-chamber effluent and process-heater feed).

TABLE 1—CATALYTIC DESULFURIZATION OF THERMAL CRACKED GASOLINES

	Charge, raw cracked gasoline	Product, unstabilized caustic washed desulfurized gasoline
Operating conditions:		
Space velocity, vol./vol./hr.		1.23
Catalyst case inlet temperature, °F.		765
Catalyst case pressure, psig.		44
Catalyst		Cyclocel grade bauxite
Product inspection:		
Gravity, °A.P.I. at 60° F.	57.5	58.2
A.S.T.M. distillation, °F.:		
I.b.p.	104	100
10 per cent evaporated	156	160
30 per cent evaporated	226	226
50 per cent evaporated	277	267
70 per cent evaporated	320	310
90 per cent evaporated	370	363
End point	415	402
Recovery, volume per cent	98.0	98.0
R.v.p., psi.	7.0	7.2
Total sulfur	0.058	0.030
Mercaptan sulfur, weight per cent	0.016	<0.001
Bromine number	68	83
Research octane numbers:		
Clear	63.5	67.0
+1 ml. TEL per gallon	72.8	76.8
+3 ml. TEL per gallon	79.4	83.6

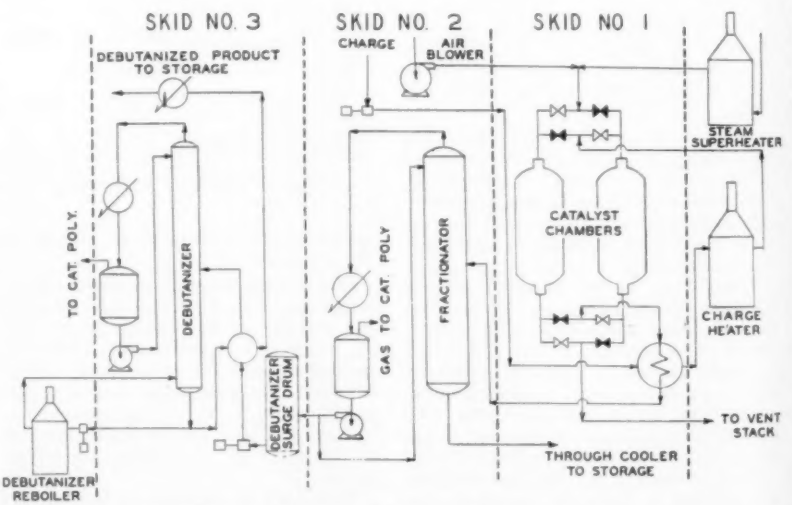


Fig. 2—Flow scheme of the unit for gasoline upgrading recently placed in operation at the Gladewater, Tex., refinery of Gladewater Refining Co.

Skid No. 2

1. Charge pump.
2. Fractionator.
3. Fractionator-overhead condenser.
4. Fractionator-reflux accumulator.
5. Fractionator-reflux pump (which also furnishes charge to the debutanizer-surge drum).
6. Rotary air compressor.

*Grebe & Doremus Process Co., Houston, †Gladewater Refining Co., Gladewater, Tex., and ‡Perco Division, Phillips Petroleum Co., Bartlesville, Okla.

TABLE 2—CATALYTIC REFORMING OF STRAIGHTRUN NAPHTHA

Operating conditions:	Perco charge	Fractionator overhead product		
		Run No. 1	Run No. 2	Run No. 3
Space velocity, vol./vol./hr.	.....	1.08	1.01	0.99
Catalyst case inlet temperature, °F.	.....	940	982	1,015
Catalyst case pressure, psig.	.....	47	50	50
Catalyst	.....	(*)	(*)	(*)
Product inspection:				
Gravity, °A.P.I. at 60° F.	51.4	54.0	53.5	53.2
A.S.T.M. distillation, °F.:				
I.b.p.	170	124	109	117
10 per cent evaporated	257	229	212	210
30 per cent evaporated	285	268	252	254
50 per cent evaporated	310	287	276	297
70 per cent evaporated	345	313	308	309
90 per cent evaporated	412	357	349	353
End point	475	404	409	427
Recovery, volume per cent	97.0	98.0	98.5	98.0
C_5+ gasoline, volume per cent of charge	100.0	93.8	90.4	83.5
R.v.p., psi. at 100° F.	1.0	4.1	6.3	4.5
Total sulfur, weight per cent	0.013	0.009	0.006	.....
Mercaptan sulfur, weight per cent	<0.001	<0.001	<0.001	<0.001
Bromine number	11	16	.....	.....
Research octane numbers:				
Clear	41.5	53.3	60.0	65.3
+1 ml. TEL per gallon	51.7	64.0	69.5	74.0
+3 ml. TEL per gallon	67.0	75.2	78.4	81.5
Calculated:				
Yield, butanized gasoline, vol. per cent of charge	100.0	102.4	95.1	90.9
R.v.p., psi. at 100° F.	1.0	9.0	9.0	9.0
Research octane numbers:				
Clear	41.5	57.3	62.0	68.0
+1 ml. TEL per gallon	51.7	67.5	70.9	76.6
+3 ml. TEL per gallon	67.0	77.9	79.9	83.6

*Cyclocel grade bauxite.

Skid No. 3
1. Debutanizer feed-surge drum, into which is fed straightrun naphtha from the topping unit as well as Perco fractionator-accumulator liquid.
2. Debutanizer-feed pump.
3. Debutanizer.
4. Debutanizer-reflux drum and pump.
5. Debutanizer reboiler-circulation pump.
6. Debutanizer-overhead condenser.

Fig. 3 shows a closeup view of Skid No. 2 which contains the fractionator and accessories. Also in this picture can be seen a portion of the stabilizer for thermally cracked gasoline.

Fig. 4, in the left foreground, shows Skid No. 1 on which the two catalyst chambers are mounted. In the right background can be seen from left to right the debutanizer reboiler, the steam superheater, and the process heater. Though installed apart from the skids, the heaters are so situated that the entire area required by the unit, including the control room and the thermal stabilizer, is about 30 by 100 ft.

The control room will include instrumentation required by the catalytic polymerization unit which is designed to handle the olefinic gases produced from the operation of the Perco unit and the thermal cracker.

The California Research Corp. film-type catalytic polymerization unit is now being added to the facilities at the plant and the absorber and stabilizer columns for this unit can be seen in the background in Figs. 1 and 3.

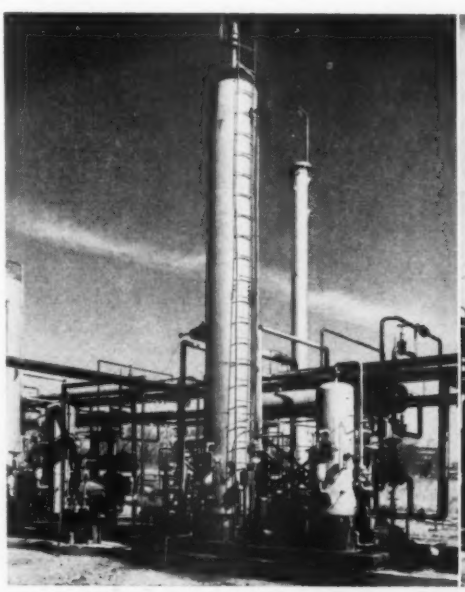
Initial operation of the unit was on a cracked-gasoline charge which was processed at desulfurization temperatures only. Table 1 shows operating data and inspection tests on charge and product.

The data of Table 1 show at 48.4 per cent removal of total sulfur and a 94 per cent removal of mercaptan sulfur with a 4.2-octane number increase at the 3-cc. TEL level.

Table 2 shows operating data and inspection tests on charge and product when processing a 175°-475° F. straightrun naphtha. The fractionator overhead is shown as the final product. Fractionator bottoms constitute about 1 per cent of the charge to the unit.

The first run listed in Table 2 represents very mild reforming of the naphtha at 940° F. This low reforming temperature was sufficient, however, to give a research octane increase of 8.2 numbers at the 3.0-cc. TEL level. More indicative of the reforming operation which Gladewater will probably employ in meeting their finished-gasoline specifications is Run No. 2. In this run at 982° F. chamber-inlet temperature, the Perco product rated 78.4 research octane (3 cc. TEL per gallon). The product quality demanded will determine the severity of catalytic reforming which can be varied over a wide range. Butanization of the above products to finished vapor pressure, as shown at the bottom of Table 2, considerably improves the octane ratings.

The unit was designed and constructed by the Grebe & Doremus Process Co. of Houston and actual fabrication was done in their shops in Houston. Installation of the utility lines such as cooling water, steam, gas, and electrical leads to required points on the skids was made by the regular maintenance crew of Gladewater Refining Co. The unit was shipped complete with the exception of the fractionator and debutanizer columns which were not erected until the skids were set on the concrete pad. These columns were insulated however, before leaving the shops.



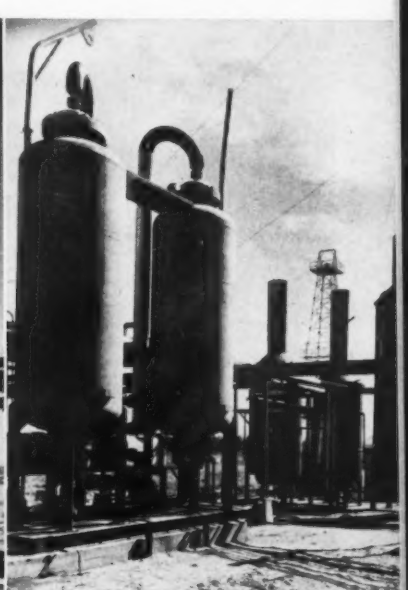
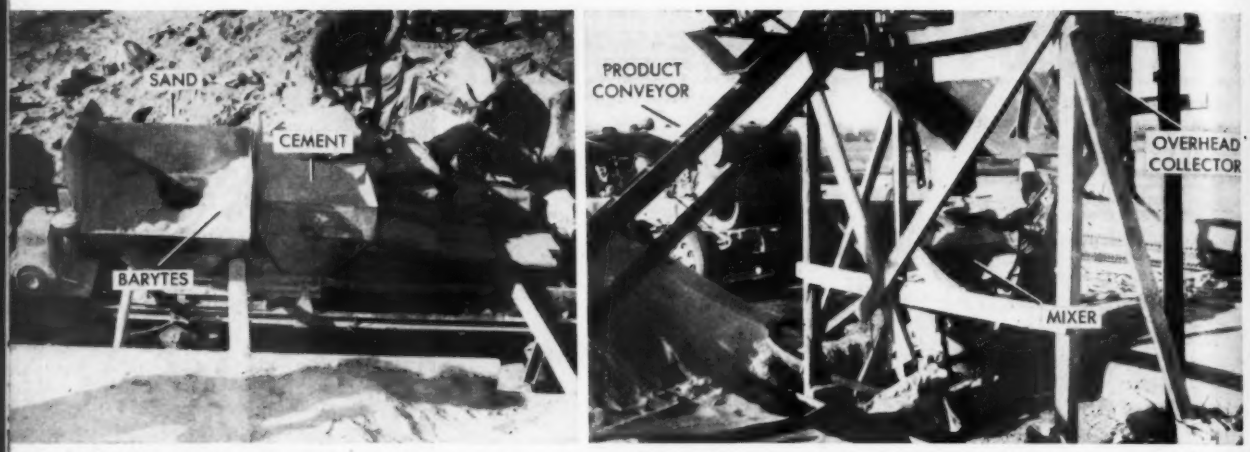


Fig. 3—(Left) Skid-mounted fractionator and accessories. This section is shown as skid No. 2 on the accompanying flow diagram.

Fig. 4—(Right) The catalyst chambers shown here are mounted on skid No. 1 as indicated on the flow chart, Fig. 2.



DRY MIX.—(Left) Crushed barytes, sand, and cement are shoveled into this gas engine-driven proportional mechanical mixer. BATCHING.—(Right) Bucket conveyor takes dry mix to overhead collector where it is batch dumped into "gun," from which it leads into a 1½-in. pneumatic hose to point of application.

Pipe-Line Crossing Uses Jacketing Of Barytes-Laden Cement

by Joseph A. Kornfeld
District Editor

Heavy additive for reinforced concrete jacketing for large-diameter natural-gas transmission pipe eliminates need for river clamps. Ballasting is improved and pipe life lengthened.

A NEW use of barytes for a weight additive to cement in reinforced jacketing of large-diameter natural-gas transmission pipe makes it possible to use a thinner jacket wall to "hold down" a line on the river bottom. It is claimed that this type of jacket can be applied at a sizable saving under that of river clamps.

The most recent installation to employ the barytes-weighted concrete in a river crossing is that at the Brazos near Wallis, Tex. Two 1,400-ft. lines of 24-in., ½-in. wall pipe are being laid for Trunkline Gas Co. Flanders Construction Co. has the contract for furnishing reinforcing and heavyweight material and applying. R. H. Fulton & Co., Lubbock, Tex., has the general contract.

SUPERVISORS LOOK PLEASED.—Inspectors, contractors, and supply men: A. B. McDaniel, distribution manager, Baroid Sales Division, National Lead Co.; John C. Smith, inspector, Trunkline Gas Co.; W. E. Halleran, Baroid; Harry C. Davis, inspector, Trunkline; F. L. Cuthbert, manager research and development, Baroid, and F. D. Flanders, Flanders Construction Co.

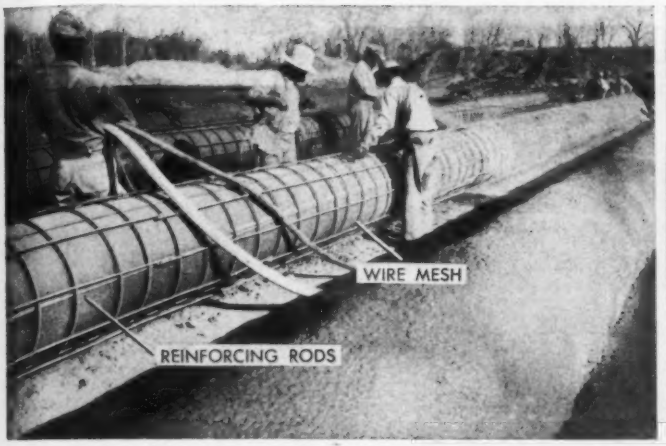
Economics.—The new method applies the concrete jacketing by pneumatic pressure.

F. D. Flanders, owner, Flanders Construction Co., calculated an approximate cost of 3 cents per pound for a protective barytes-laden reinforced cement jacketing as against a cost of 5 cents per pound for cast-iron river clamps. The former method is physically advantageous in that it distributes the weight all along the pipe. On the other hand, the latter method concentrates the weight at intervals along the pipe; this often results in the enamel being worn through and allows corrosive condiions to be set up.

Barium sulfate.—The weight additive, known in the trade as Barawate, is comprised of barium sulfate, 98 per cent chemically pure. The material has a specific gravity of 4.3. The bulk density of the crushed barytes varies from 190 to 210 lb. per cu. ft. dependent upon particle size. Compression strengths of Barawate cement mixtures have been obtained as high as 7,000 psi. after 28 days.

Dry mix. — The barytes ore, in crushed form, is shipped from the mine by box car to the railroad point nearest the scene of actual pipe-line construction, where it is transferred to trucks for transport to the river-crossing site. Mixing is done in the open. Barytes, sand, and cement are dumped from wheelbarrow into three hoppers, each adjacent to the others. The optimum dry mix is 50 per cent barytes, 50 per cent sharp sand, and a 4-to-1 ratio of cement to barytes-sand.

A proportional mechanical mixer, shown on this page, operating by



JACKETING PREPARATION.—(Left) View showing successive steps of wiring on ring and longitudinal reinforcing bars and wrapping on wire mesh. Concrete already has been applied on pipe in the immediate foreground. SPRAYING IS EASY!—(Right) L. L. Davis, nozzleman, is shown applying the barytes-laden cement.

reciprocal motion imparted by a cam arrangement attached to a gas engine, delivers the dry mix to an overhead conveyor which dumps the load into a collector. An operator, called a "gunner," loads the premixed dry mix into the gun from an overhead hopper. (The gun has two chambers that allow continuous operation.) The gunner regulates the flow of dry material to the nozzle by valves and levers that control the amount of mixed material carried through the material hose by air to the nozzle. A 1-in. water hose leads from an air-driven pump to the nozzle and the nozzleman controls the amount of water, commensurate with the amount of dry mixed material he is getting from the gun. A 315-cu. ft. per minute compressor is used to furnish air to operate the gun and water pump. The water is forced into the nozzle body through a water ring with 14 holes in it. Therefore, as the material is carried through the hose and out the nozzle by air pressure it is mixed with water shooting from the ring from all angles. Thus the hydrating process takes place only a split second before the material is shot onto the pipe.

Pipe reinforcing.—Forty-foot joints of 24-in. pipe with ½-in. wall (coated and wrapped) are double jointed to form 80-ft. lengths by arc welding with reinforcing sleeves 4 in. in width. Four ½-in. reinforcing rods are first placed on the pipe at the four quadrants of the pipe running longitudinally. Then ½-in. circular reinforcing rods are placed over these at 1-ft. intervals. On top of these are placed again ½-in. reinforcing bars longitudinally. These are tied to the rings with soft wire. This makes a thickness of 1½ in. from the surface of the pipe to the last reinforcing bar.

An over-all cover of 14-gage, 2 by 2-in. wire mesh is placed over the above reinforcing. The netting, which is manufactured in rolls having a width of 6 ft., is slung under the pipe and overlapped. Soft wire is used to tie down the netting at numerous points along the pipe to insure a consistently uniform diameter for the reinforcing. Latest practice by this contractor employs the use of 3 by 3-in. mesh and a wire size of either 8 or 10-gage and eliminates the need for reinforcing rods.

Construction Costs

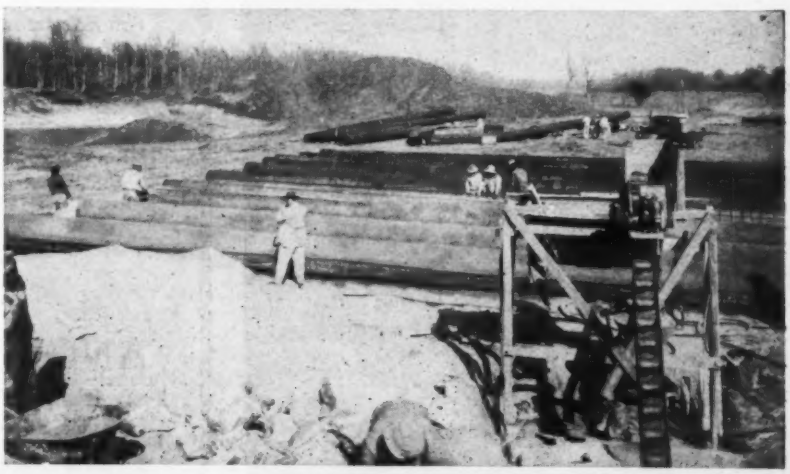
Approximate cost of coating natural-gas transmission pipe with reinforcing mesh and jacketing with a 2-in. thickness of barytes-laden cement.

Line size (diam. in.)	Price per lineal ft.
16	$3.50
20	4.40
24	5.50

Pneumatically applied concrete.—The actual coating applied by the air employs the building up of a coating of barytes-laden cement about 2 in. in thickness. The nozzleman holds the nozzle so that a stream of material is aimed directly at the pipe at a distance of 30 in. from the periphery. The material is applied longitudinally from one end of the pipe to the other. The pipe is coated to proper thickness and density.

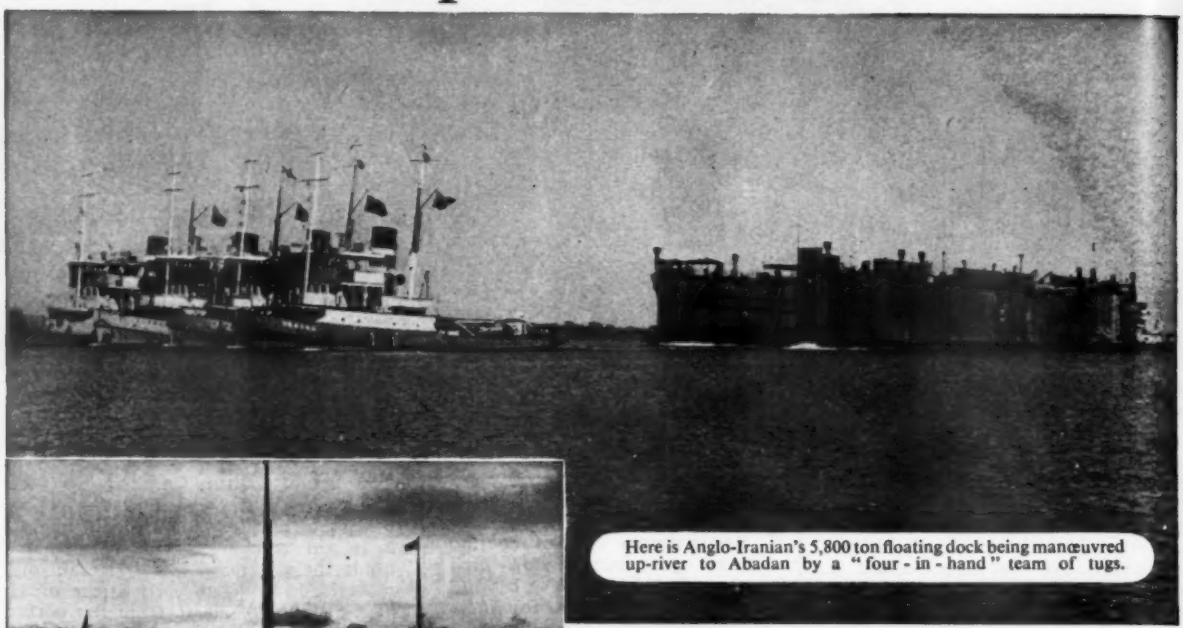
The upper half of the shell is first coated, then allowed to remain on the wooden racks for curing. Afterwards, the pipe is rotated on the horizontal wooden stands through 180° and the other half of the shell is applied.

Job performance.—Flanders states that from eight to ten 40-ft. joints can be coated in a single 8-hour day with one gun or approximately 350 linear feet of 24-in. pipe per day. However, a two or three-gun "spread" or "setup" is generally used to afford completion of 1,000 linear feet per day.



MASS PRODUCTION.—All work is handled on an assembly-line basis. Pipe is arranged in long parallel groups. Works starts in the background with double-jointed sleeve-welded transmission pipe.

Ships of the Line



Here is Anglo-Iranian's 5,800 ton floating dock being manœuvred up-river to Abadan by a "four-in-hand" team of tugs.

A vast variety of vessels is afloat in the service of Anglo-Iranian, besides the huge tanker fleet to which the ship on the left now belongs. This is the "British Adventure", launched in December, 1950—of 28,100 tons—the largest tanker so far built in Britain. Even bigger vessels are now on order for Anglo-Iranian's fleet.

Launches for refuelling flying boats.

Fire Drill on board one of Anglo-Iranian's fire floats.

First and Biggest

oil producers in the Middle East since 1912, Anglo-Iranian Oil Company and its associated companies also operate twelve refineries in Europe, Middle East and Australia; their sales organisation includes major marketing or supply interests in Europe, Asia, Africa and Australasia, with international ships' bunkering and aviation services.

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Beam-Pumping Units

(Continued from page 79)

the timing wave placed on this center line in a position where an arc drawn with a radius equal to the length of the recording stylus will just touch the dynamometer card at each end. With this same radius of arc each one of the numbered timing cycles may be scribed off on the upstroke and downstroke.

The polished-rod load vs. time curve is then plotted by projecting the load characteristic on the same time base to which the displacement and velocity curves were plotted.

When the prime-mover speed is recorded with a recording tachometer, care should be taken to mark the position of the speed at one end of the pumping stroke. Since the popular type of tachometer also records 1-second "pips," the variation in speed over one pumping cycle may be plotted in the correct relationship with the rest of the curves on the same time axis.

When the instantaneous velocity at a particular point is known and the instantaneous load, the product of the two is proportional to the instantaneous horsepower. When a sufficient number of points are considered, the instantaneous-horsepower curve may be drawn showing what it would be without any counterbalance and also what it is with the counterbalance as measured at the polished rod.

In order to check the horsepower curve the area of the entire curve above the zero line may be measured with a planimeter and the average horsepower computed. This should check with the regular polished-rod horsepower.

In order to obtain the instantaneous torque curve, the instantaneous speed of the crank is computed from the prime-mover speed and the torque curve is then proportional to horsepower divided by the instantaneous speed.

Sample Calculation

The following is a sample calculation with detailed values from the analysis in Fig. 4:

1. **Velocity curve:**

Over-all length of timing wave = 3.68 in.

Measured length of polished-rod stroke = 64 in.

Over-all reduction ratio = 64/3.68 = 17.4.

Consider the increment of travel between points 9 and 10. Each half cycle has been numbered in this example.

Distance from point 5 to 6 = 0.336 in.

Since the timer frequency in this case = 7.26 cycles per sec. the average velocity from point 5 to 6 (½ cycle) would be:

$$\frac{0.336 \times 17.4}{1/(2 \times 7.26)} = 85 \text{ in. per second}$$

This value is then plotted midway between ½ cycle 5 and 6 as shown at point.

2. **Instantaneous-horsepower cycle:**

Now consider the number 6 point for calculation of instantaneous horsepower.

From velocity curve, velocity = 86.0.

From load curve, load = 15,400.

A. Instantaneous horsepower, no counterbalance:

$$\text{hp.} = \frac{\text{load} \times \text{velocity}}{12 \times 550}$$

$$= \frac{15{,}400 \times 86}{12 \times 550} = 202$$

B. Instantaneous horsepower, 10,600-lb. counterbalance effect:

$$\text{Unbalanced load} = 15{,}400 - 10{,}600$$

$$\text{hp.} = \frac{(15{,}400 - 10{,}600)\ 86}{12 \times 550} = 62.5$$

C. Instantaneous horsepower, counterbalance effect corrected to 9,000 lb.:

$$\text{hp.} = \frac{(15{,}400 - 9{,}000)\ 86}{12 \times 550} = 83.0$$

3. **Instantaneous-torque curve:**

Consider number 6 point for calculation of instantaneous torque.

From the fundamental relationship:

$$\text{hp.} = \frac{2\pi \times \text{r.p.m.} \times \text{torque}}{33{,}000 \times 12}$$

The expression for torque becomes:

$$T = \frac{63{,}000 \times \text{hp.}}{\text{r.p.m.}}$$

Then for the above B condition:

$$T = \frac{63{,}000 \times 62.5}{26}$$

$$= 150{,}000 \text{ in.-lb.}$$

For the C condition:

$$T = \frac{63{,}000 \times 83}{26}$$

$$= 190{,}000 \text{ in.-lb.}$$

All of the sample calculation points are circled on Fig. 4.

The present formula for calculating peak torque, as given in A.P.I. Std. 11-E, has been discussed on many occasions and found to give misleading results, but it has served the purpose of making everyone cognizant of the fact that gear boxes should be rated on a peak-torque basis rather than a horsepower basis as they were originally. In making computations for peak torque, the following procedure has been found to give results closer to the measured results because the counterbalance effect is not taken as a certain definite percentage of the peak load but rather a mean between the peak load and minimum.

The peak load is calculated as follows:

$$PL = W_f + W_r\,1 + N^2L/70{,}500$$

where:

PL = polished-rod load, lb.
W_f = weight of fluid, lb. (Area of plunger-area of rods) × (psi).
W_r = weight of rods, lb.
L = Length of stroke, in.
N = number of strokes per min.

The minimum load is calculated as follows:

$$PL\ (\text{min.}) = W_r\,(1 - c) - W \times 62.5/490$$

Values of W_r and c are the same as used for peak load.

The amount of counterbalance effect is then taken as the mean and the unbalanced load as the difference between this effect and the maximum and minimum loads.

This unbalanced load multiplied by half the length of the stroke gives the peak torque.

This procedure also ties in closely with the theoretically correct counterbalance which is the weight of the rods plus one-half of the fluid weight.

The simplicity of the present A.P.I. formula is commendable, but it is felt that this could be supplanted by another simple relationship such as the one given above which would get closer to the answer.

In using all of the counterbalance tables which are presented by the various pumping-unit manufacturers, it is found that there is considerable misunderstanding and as a consequence these tables lose a great deal of their effectiveness. In many cases it is very difficult to identify the type of crank and weight in the field to tie it in with the tables given.

It is proposed that steps be taken to simplify the presentation of the counterbalance effect so that it may all be tied in with the measurements which can be made readily in the field. This should result in an advantage to everyone concerned.

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Down-the-Hole Pressure Surges

and their effect on loss of circulation

by W. C. Goins, Jr., J. P. Weichert, J. L. Burba, Jr., D. D. Dawson. Jr., and A. J. Teplitz

BECAUSE of some particularly troublesome lost-circulation difficulties in a number of wells drilled in 1948, Gulf Oil Corp. assigned a group of engineers to the general study of the problem. The 1 S. S. Perry well at Peach Point had 45 separate losses of circulation, and it was decided that future operations in this area would be closely studied by the group.

Observations made during the course of drilling the 2 S. S. Perry well in this field revealed that there were 22 instances of loss of circulation; and that of these 3 were associated with balling of the drill collars, 6 with downward movements of balled collars, 5 with downward pipe movements alone, and 8 could not be associated with any apparent cause. The methods through which this information was developed were:

The pipe was usually pulled from the hole after each loss, and balling was observed at the surface. Otherwise balling was detected from the drag occurring during pipe withdrawal to the casing or through the use of a pump-stroke recorder which showed a slowing of the mud pump as the ball formed. Also, it was observed that development of balling coincided with pronounced increases in viscosity of the silicate mud used.

Pipe movements were shown to be an immediate cause of loss of circulation through the use of a pit-level recorder which was mounted on the rig floor. Although the purpose of this instrument was the detection of changes in mud volume, it was observed that vibrations of the draw works during working of the pipe shook the recording pen of the instrument so that each sharp movement could be identified.

Another noteworthy observation was that in this field the hole almost invariably remained full after a loss of circulation, indicating that the formations in the area were capable of supporting the required hydrostatic pressures. This was true even though mud densities as high as 17.5 lb. per gallon had been used. This led to the conclusion that pressures in excess of necessary hydrostatic pressure, caused by balling and pipe movement, were breaking down the formation after which the circulating pressures were sufficient to cause the formation to take mud. It was believed that if the pressures could be kept near the required hydrostatic pressure, then losses could be prevented.

THE AUTHORS

Left to right: W. C. Goins, Jr., J. P. Weichert, J. L. Burba, Jr., and D. D. Dawson, Jr., Gulf Oil Corp., Houston; and A. J. Teplitz, Gulf Research & Development Co., Pittsburgh. Goins, Burba, and Dawson are members of a study group for loss of circulation organized by Gulf in 1949 in the Houston Division. Weichert is Gulf Coast petroleum engineer for the company; and Teplitz has studied special field problems in the Gulf Coast district for Gulf Research & Development Co. Portion of paper presented at A.P.I. Division of Production meeting, Beaumont, Tex., March 7-9, 1951.

It was evident that balling would substantially raise the pressure below the point of the ball and working of balled pipe would be expected to magnify this effect. If balling could be eliminated, high pressures from this source would be avoided.

Circulating pressures below the bit could be approximated and were known to be of a low order. No information was available as to the magnitude of pressure surges due to pipe movement, and a decision was made to investigate these to see if they were great enough to be responsible for breaking the formation down.

Measurement of Pressure Surges Due to Pipe Movement

A sub was made to replace the bit in a drilling string and two pressure recorders were attached. The sub contained two ⅝-in. ports through which circulation could be established, and the pressure recorders were either 7,500 or 15,000-psi. drill-stem test recorders furnished through courtesy of Johnston Oil Well Testing Co. These were selected because of their rugged construction and their ability to measure high pressures.

Using this equipment tests were run inside casing in a number of wells to determine the effects of running and withdrawing pipe, spudding while pumping, and rapid opening of pumps to start circulation. Table 1 lists the mud properties and casing-drilling string combinations of the wells in which the tests were made.

Cannon[1] has shown the pressure reduction obtained during pipe withdrawal. He found that the amount of the reduction was largely dependent upon the gel strength of the mud, the length of the pipe, and the annular clearances. In the tests reported the mud did not have gel strengths. Consequently the swabbing effects were of low order.

Test 1, in which the mud was slightly cement cut and gelled, gave a pressure reduction of 350 psi. at 8,500 ft. The results from other tests were generally 100 psi. or less at all depths. Withdrawing one stand in 60 to 80 seconds in Test 1 gave the surges less than 50 psi. at all depths. In the other tests, withdrawing pipe at 50 to 60 seconds per stand also gave pressure reductions of less than 50 psi.

It was surprising to find that pressure reductions generally occurred when the pipe was withdrawn while pumping was in progress. These reductions were of a low order for the tests conducted, but were greater than the reductions due to withdrawing stands of pipe at maximum rates. Slow rates of withdrawal of pipe while pumping was in progress gave less than 50-psi. pressure reductions.

Summary of Test Results

As a result of the tests it was found that running pipe at normal rates and rapidly spudding during circulation gave pressure surges of

a high order that increased with depth. Rapidly breaking circulation also gave large pressure surges. These pressure surges are great enough when imposed on hydrostatic pressures to frequently be an immediate cause of loss of circulation.

The surges may be avoided through slowed rates of pipe movement and slow breaking of circulation. While the effect of annular clearances and mud properties on these surges was not clearly shown, the tests were conducted under a variety of conditions which indicated that the effects found should be expected in almost any well.

The information developed was applied in the drilling of a recent well at Peach Point, the 1 J. F. Perry et al Unit. Every effort was made to keep to a minimum the pressures above required hydrostatic pressure. Three and one-half-inch drill pipe with Hydril slim-hole tool joints without rubber protectors was used below the 7-in. casing, the interval which in previous wells had given the most difficulties. This increased the annular area over that with the pipe formerly used and was expected to reduce annular circulating pressure.

The viscosity and gels of the mud were kept as low as possible. Balling was eliminated through the use of a controlled rate of drilling and emulsion muds containing 10 per cent diesel oil and sodium tall-oil emulsifier.

The pumps were opened slowly when circulation was started and a controlled rate of pipe movement was initiated. This involved running pipe in the hole at a rate so that from 35 to 40 seconds were required to drop one stand of pipe. Since a normal rate is from 14 to 15 seconds, this added less than 1 hour to trip time, even as deep as 10,000 ft.

Precautions were taken to keep pipe movements to a very slow rate while pumping was in progress. It was believed that these measures would keep the pressure surges in the well to 100 psi. or less.

The success of the over-all program to keep pressures down was evidenced by the fact that this well was drilled to total depth without loss of circulation, even though there had been a total of 79 losses while drilling the three previous wells in this field.

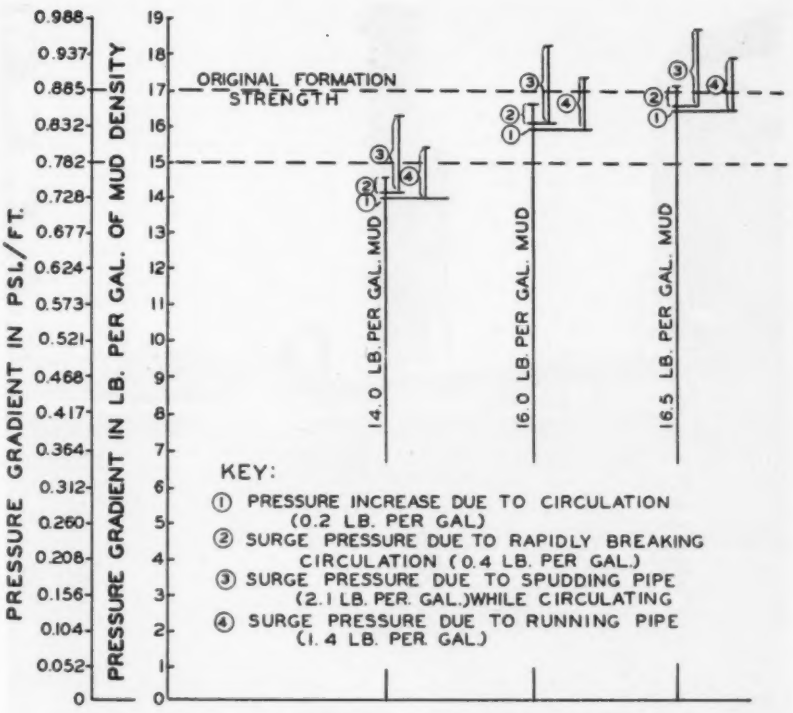


Fig. 1—Pressures to cause loss of circulation in a theoretical well.

General Application of Test Results

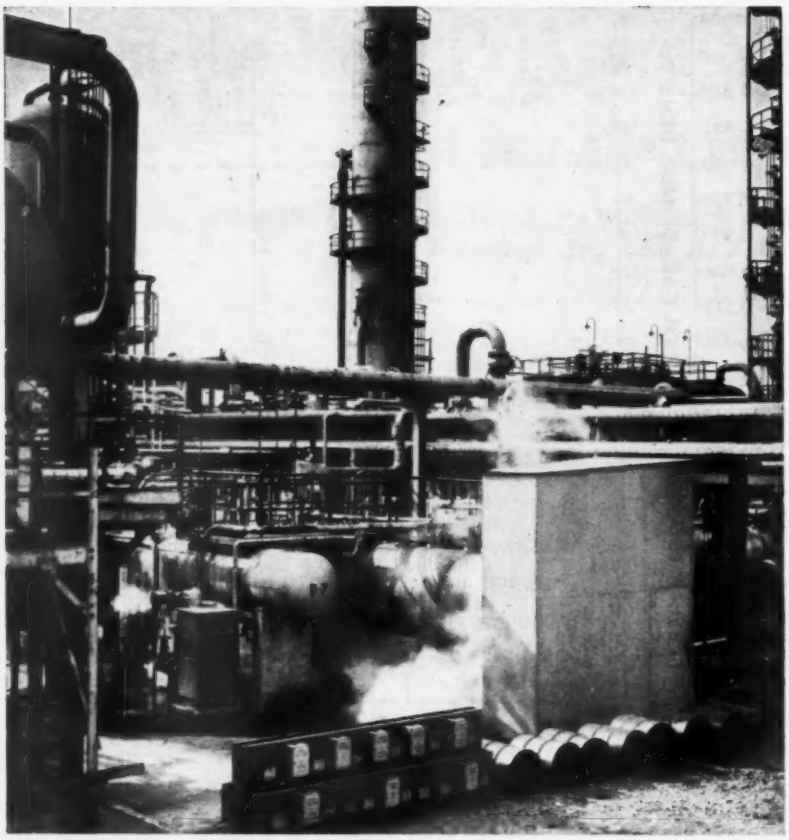
It is not intended to imply that lost circulation may always be prevented through the methods of keeping pressures in excess of required hydrostatic pressure to a minimum. In some wells exposed formations will not support the necessary hydrostatic pressure. However, it is reasoned that high surge pressures would complicate attempts to seal such formations and might repeatedly break them down even after they had been sealed sufficiently to support the required hydrostatic pressure.

Fig. 1 has been prepared to illustrate the manner in which it is believed that loss of circulation often occurs in abnormal-pressure drilling in the Gulf Coast area. It is set up for a theoretical hole which would support a mud of 17 lb. per gallon density, or a pressure gradient of 0.885 psi. per foot without breaking down. This figure approaches the maximum pressure that most holes will withstand. If a 16-lb. per gallon mud is used, circulation would add a down-the-hole pressure equivalent to about 0.2-lb. per gallon mud density increase, and no loss of circulation should occur. If the pipe is spudded rapidly or run in the hole at the usual rates, pressure surges equivalent to about 2.1 or 1.4 lb. per gallon of mud density, respectively, may result. Either of these added to

(Continued on page 104)

TABLE 1—TABLE OF MUD PROPERTIES AND PIPE-CASING COMBINATIONS FOR WELLS IN WHICH TESTS WERE MADE

Type of mud used—	Density (lb./gal.)	Funnel viscosity (sec.)	Stormer viscosity (sec.)	Thixotrophy (grams) Initial	Thixotrophy (grams) 10 min.	Casing size (in.)	O.D. rubber protectors (in.)	Annular area (sq. in.)	O.D. drill collars (in.)	Annular area (sq. in.)	O.D. tool joint (in.)	Annular area (sq. in.)	O.D. drill pipe (in.)	Annular area (sq. in.)	Max. recording pressure of gage used (psi.)
Caustic and quebracho thinned, fresh water mud	10.1	44	..	Slightly cement cut		7	4½	14.3	4½	14.3	3⅞	18.5	2⅞	23.8	15,000
Caustic and quebracho thinned, fresh water mud	11.8	46	52	0	1	7⅝	4⅞	18.5	4½	21.2	4½	21.1	3½	27.4	7,500
Lime treated mud	16.2	82	63	4	7	7	None used	...	4	17.6	3⅞	18.5	3½	20.3	15,000
Sodium silicate mud	14.0	49	..	2	8	9⅝	6⅜	27.1	6¼	30.9	5⅞	36.8	4½	46.2	7,500
Lime treated mud	11.8	43	27	0	0	9⅝	6¾	25.8	6¼	30.9	6	33.3	4½	46.2	15,000



Esso Standard Oil Co.'s new Sodafining unit at one of its refineries. The caustic-washing system equipment is shown in the center foreground of this view of the plant. Catalytic naphtha charged to the system is split in the tower seen in the center background. Another tower, partly visible on the right, is the debutanizer for the naphtha stream.

Sodafining—

Catalytic gasoline-stability control by caustic washing before exposure to air

by Minor C. K. Jones*

WITH the trend to heavier, higher-sulfur feeds to fluid catalytic cracking there has been an indication that the raw gasoline is less stable. However, it has been discovered that this instability can be avoided by application of a process developed by Standard Oil Development Co. This process, involving controlled caustic washing before exposure to air, has been christened "Sodafining."

The stability of catalytically cracked motor gasoline is very closely related to the concentrations of two of its minor components—aromatic mercaptans and reactive unsaturates. When present in combination in sufficient concentrations, these compounds result in extremely rapid peroxidation and gum formation upon contact with air. Removal of the aromatic mercaptans by prompt caustic washing before any possible contact with air corrects this initial extreme instability, and the concentration of reactive unsaturates in the caustic washed product then determines the stability level.

In catalytic cracking, the aromatic mercaptans or thiophenols result primarily from the sulfur in the feed stock so that high-sulfur feed stocks produce the greatest amount of these mercaptans. Higher-boiling feed stocks also tend to produce more olefinic products.

Data on commercial gasoline samples are presented in Table 1. These include, in addition to conventional inspections, measurement of gum formed after 5 hours' oxidation at 212° F. under 100 psi. oxygen pressure; this test is the A.S.T.M. (D-873-49) test for oxidation stability of aviation gasoline (potential gum method). Sample A produced from normal feed is of quite satisfactory stability although ease of peroxidation of the raw sample is evident. Caustic washing before air contact removed aromatic mercaptans, and reduced peroxidation and gum formation.

Low Values on Oxidation Tests

Both the original and the caustic-washed samples gave low values on the 5-hour oxidation test. Sample B, produced by cracking a heavy, high-sulfur feed stock, shows considerable aromatic mercaptan content, peroxidation, and gum formation, which are corrected by caustic washing before air contact. The breakdown values on Sample B are misleading, since the raw and caustic washed cases are equivalent on this basis, whereas on the basis of the gum formed the raw gasoline is markedly inferior.

Sample C is still another example of catalytic gasoline from cracking a high-sulfur vacuum-flashed gas oil, showing a 20 mercaptan number due to considerable thiophenol content which is removed by caustic washing before air contact. It will be noted that Sodafining provided excellent A.S.T.M. and copper-dish gum levels, and reduced the gum content by the aviation gasoline potential gum method from 109 to 6.

An exceptionally unstable gasoline produced in a pilot unit is described

TABLE 1

Naphtha inspections—	Sample A		Sample B		Sample C	
	Raw	Caustic washed*	Raw	Caustic washed*	Raw	Caustic washed*
Mercaptan number†‡	3	1	15	0.5	20	0.5
Peroxide number†§	1.6	0.3	1.8	Nil	0.2	0.1
A.S.T.M. gum—mg./100 ml.¶	3	1	13	3	...	0.2
Copper dish gum—mg./100 ml.‖	7	3	10	4	...	3
A.S.T.M. breakdown—min.‖	1,040+	1,040+	460	460	...	555
5 Hrs. aging gum—mg./100 ml.‖	5	5	114	13	109	6

*Caustic and water washed under nitrogen and maintained under nitrogen until tested or inhibitor added. †Nitrogen blanketed during test. ‡Milligrams of mercaptan sulfur per 100 ml. §Gram equivalents of active oxygen per 1,000 l. ¶Inhibited with 1 lb. phenylenediamine type inhibitor per 5,000 gal. ‖Inhibited with 2 lb. phenylenediamine type inhibitor per 5,000 gal. A.S.T.M. test D-873-49 for Oxidation Stability of Aviation Gasoline (potential gum method) reporting air jet gum after 5 hours' oxidation.

*Process division, Esso Laboratories, Standard Oil Development Co.

TABLE 2

Column—	1	2	3	4
	Raw stock		Caustic and water washed under N_2	
	Under N_2	Exposed to air*	Under nitrogen until tested or inhibitor added	Exposed to air (before inhibitor addition)*
Mercaptan number†§	19	1.5	1	1
Peroxide number†¶	0	3.5	0	0.3
A.S.T.M. gum—mg./100 ml.‡	..	17	4	6
Copper dish gum—mg./100 ml.‡	..	193	11	..

*Uninhibited sample shaken with approximately 4 volumes of air per volume of sample for 3 minutes and allowed to stand at room temperature for 16 hours. †Nitrogen blanketed during test. ‡Inhibited with 1 lb. phenylenediamine type inhibitor per 5,000 gal. §Milligrams of mercaptan sulfur per 100 ml. ¶Gram equivalents of active oxygen per 1,000 l.

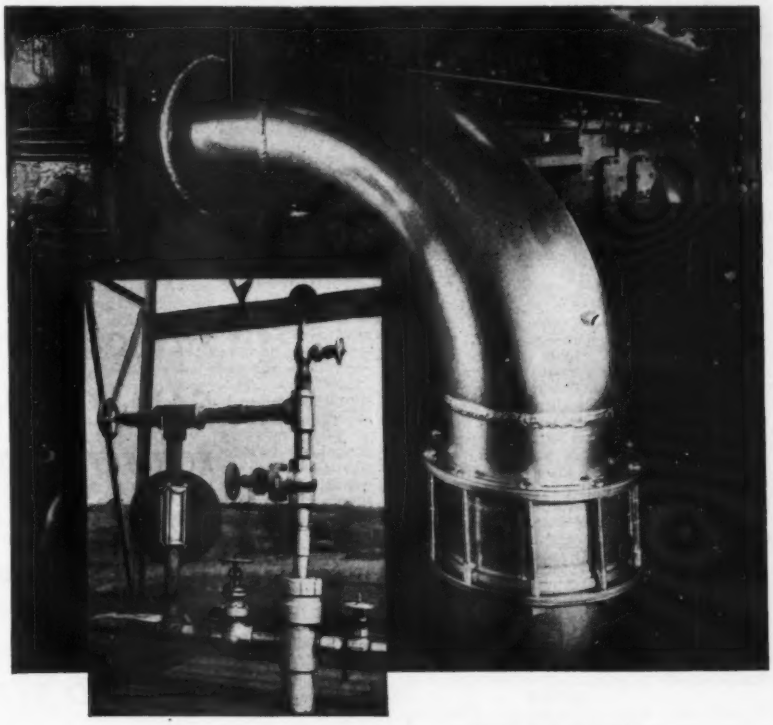
in Table 2. The first column in Table 2 shows the mercaptan and peroxide contents of a sample of this gasoline which had been protected from all contact with oxygen during sampling and handling as described subsequently. As shown in the second column, exposure to air oxidized the aromatic mercaptans so that the original mercaptan number of 19 was reduced to 1.5. The former represents total mercaptan content, while the latter shows the aliphatic mercaptan content, so that the quantity of aromatic mercaptans present is indicated by the difference between these values. The oxidation of aromatic mercaptans shown in column 2 was accompanied by peroxidation to the substantial 3.5 peroxide number and formation of large amounts of gum.

In contrast to these poor results, the third column shows that Sodafining removed essentially all the mercaptans and the customary inhibitor addition before exposure to air resulted in a stable gasoline. The data in column 4 (gum formation and slight peroxidation) show how sensitive this particular gasoline was to air exposure in the laboratory before inhibitor addition, even after removal of aromatic mercaptans, but the data in column 3 show that when properly handled even this extremely sensitive gasoline is entirely free of peroxidation and quite satisfactory. This demonstrates the importance of protecting test samples of gasoline from exposure to air before inhibitor addition (as is the case in plant flow) in order to obtain results representative of commercial operations. It should be realized, of course, that gasolines can be produced which require treatment for stability beyond caustic washing. In many instances, however, caustic washing and inhibitor addition before air contact eliminate the need for additional treating which would otherwise be required. Furthermore, this technique permits establishing more accurately what might be termed the "basic" stability of the catalytic product under examination.

Heating-oil fractions require considerations similar to those just discussed for naphtha. If not promptly caustic washed, these heavier materials also air sweeten and peroxidize, the ill effects of which are evidenced by large increases in carbon-residue values, and in some cases, by severe loss in color. In Table 3, data on catalytic heating oil from cracking heavy feed stock illustrate these effects.

To prevent the occurrence of the undesirable reactions described above in research and in process-control test work, it has been found necessary to handle samples in the **complete** absence of oxygen. This is effected by maintaining a blanket of "Seaford" grade (Air Reduction Co.) or "Prepurified" grade (Matheson Co.) nitrogen during sampling and test; both brands are supplied against a maximum oxygen specification of 0.002 per cent. Ordinary nitrogen supplied

(Continued on page 104)



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Digests

AMERICAN CHEMICAL SOCIETY

Here are short abstracts of the papers presented at Cleveland, April 8-12, at a symposium on composition of petroleum and its hydrocarbon derivatives.

Composition of United States Crude Oils

HAROLD M. SMITH, Bureau of Mines, Petroleum Experiment Station, Bartlesville, Okla.

THIS paper presents a statistical study of the following properties of United States crude oils: sulfur content, viscosity, asphalt content, naphtha and gas-oil content, per cent of aromatics and paraffins-plus-naphthenes in the naphtha and gas oils, and the proportion of naphthene ring and paraffinic chain in the paraffin-naphthene portion. The data are considered under eight geographical divisions and are presented as bar graphs in terms of per cent of crude oil produced falling within selected limits for the properties studied. The crude oils considered represent 330 fields or about 65 per cent of all the oil produced in the United States.

Our Present Knowledge of The Petroleum Acids

H. L. LOCHTE, University of Texas, Austin.

ACIDIC compounds from crude oil and from straightrun distillates consist of a mixture of phenols, aliphatic, naphthenic, and traces of aromatic acids.

The naphthenic acids which have been identified consist of cyclopentyl and cyclohexyl carboxylic and acetic acids. In the European acids most carefully studied, the cyclopentyl acids are the predominant type and von Braun's work shows most of them have at least one methylene group between cyclopentyl and carboxyl groups.

Acids with two or more rings have been isolated and physical properties indicate their presence among the higher acids but nothing is known about their structure.

Hydrocarbons in the Gasoline Fraction of Petroleum

FREDERICK D. ROSSINI and BEVERIDGE J. MAIR, A.P.I., Research Project 6, Carnegie Institute of Technology, Pittsburgh.

THE present status of the work of the A.P.I. Research Project 6 on the isolation and analysis of hydrocarbons in crude petroleum is summarized. The isolation of hydrocarbons from one representative crude petroleum (Ponca City, Okla.) and the analysis of the gasoline fractions of seven representative crude petroleums are reported. Some comments regarding the relative abundance of the different components in a given crude and the relative abundance of compound types in different crudes are made.

Cyclopentane and Neohexane In Petroleum

ROBERT F. MARSCHNER and DONALD E. BURNEY, research department, Standard Oil Co. (Ind.), Whiting, Ind.

CHAVANNE in 1922 recognized both cyclopentane and neohexane (2,2-dimethylbutane) in the fraction of petroleum boiling near 49°. Although these two hydrocarbons boil close together, both have since been individually isolated from different naphthas in which the ratio of the two was particularly favorable. Examination of dissimilar naphthas shows that the cyclopentane-neohexane mixture is consistently present in petroleum to the extent of about 0.1 per cent. The ratio of the two hydrocarbons varies widely, however, and is characteristic of each naphtha. Cyclopentane and neohexane form an azeotrope which boils near 49.1°. Cyclohexane forms similar azeotropes with 2,4-dimethylpentane and with triptane (2,2,3-trimethylbutane).

Analysis of Naphtha From Fluid Catalytic Cracking

F. W. MELPOLDER, R. A. BROWN, W. S. YOUNG, and C. E. HEADINGTON, Atlantic Refining Co., Philadelphia.

THIS paper gives the composition of a naphtha prepared by the catalytic cracking of a gas oil using a synthetic silica-alumina fluid bed catalyst at 900° F. Ninety-two individual hydrocarbons, including 21 olefins, in addition to 60 groups or classes of compounds, were determined. The methods employed in making such an analysis are outlined briefly and include mass, ultraviolet, and infrared spectroscopy supplemented by fractional distillation, adsorption, and hydrogenation. Cyclopentane rings were found to outnumber cyclohexane rings by more than three to one while among the noncyclics monomethyl substitution was found to be the predominant configuration.

Composition of Virgin, Thermal, And Catalytic Naphthas From Mid-Continent Petroleum

WILLIAM E. CADY, ROBERT F. MARSCHNER, and WENDELL P. CROPPER, research department, Standard Oil Co. (Ind.), Whiting, Ind.

NAPHTHAS produced by distillation, thermal cracking, and catalytic cracking of Mid-Continent petroleum have been analyzed and compared. Each analysis involved fractionation followed by selected physical, chemical, and spectrometric examination of the fractions. The distributions of the five to eight-carbon hydrocarbons in these naphthas have been compared with those cited in the literature and with certain thermodynamic equilibrium data.

The compositions of the cracked naphthas are in accord with a free-radical mechanism for thermal cracking and a carbonium-ion mechanism for catalytic cracking.

Sulfur Compounds in Petroleum

J. S. BALL, Petroleum and Oil-Shale Experiment Station, Laramie, Wyo., and H. T. RALL, GUY WADDINGTON, and H. M. SMITH, Bureau of Mines, Bartlesville, Okla.

THIS paper is a general review of current knowledge concerning sulfur compounds in petroleum and of present research in this field. The distribution of sulfur and sulfur types in United States crude oils is given. The pertinent literature is reviewed briefly. The identification of all theoretically possible sulfur compounds save three (with carbon and hydrogen) boiling below 85° C. in a straightrun distillate from Wasson, Tex., crude oil is described. The preparation of "standard samples" of highly purified sulfur compounds and their thermal stability are discussed. The program of A.P.I. Research Project 48, which encompasses the above work, is outlined.

Our Present Knowledge of The Bases in Petroleum

H. L. LOCHTE, University of Texas, Austin.

CRUDE oil contains from less than 0.05 to about 0.8 per cent of nitrogen, of which part is basic and can be extracted with dilute mineral acids and part can be extracted only with concentrated sulfuric acid or with liquid sulfur dioxide.

Very little is known about the nonbasic nitrogen, but the basic compounds consist of heterocyclic tertiary amines. A series of alkyl and naphthenyl pyridines, quinoline (but not isoquinoline), and a series of alkyl quinolines (with substituents at preferred positions) have been isolated from straightrun distillates and identified. Pyridines, isoquinolines, and new types of quinolines have been isolated from cracked distillates.

Analysis of Gas-Oil Feed And Cycle Stocks From Catalytic Cracking

E. M. CHARLET, K. P. LANNEAU, and F. B. JOHNSON, Esso Laboratories, Esso Standard Oil Co., Louisiana Division, Baton Rouge.

A CHROMATOGRAPHIC technique is described for a type separation of the polynuclear aromatic hydrocarbons found in heavy gas oils and cycle oils. Use of a sectional adsorption column is discussed.

Infrared and ultraviolet spectra carbon-hydrogen determinations and molecular weight are combined in the quantitative analysis of the aromatic fractions from a heavy gas oil and a heavy catalytic cycle oil. The compositions are presented as weight per cent of each molecular type found in the aromatic portion. Further data are presented to show the average weight per cent of aromatic rings in each of the molecular types found.

Molecular Structure and Properties of Lubricating-Oil Components

J. G. LILLARD, W. C. JONES, JR., and J. A. ANDERSON, JR., Humble Oil & Refining Co.

VARIOUS lube-oil samples, essentially wax-free, covering a wide boiling range and derived from different crudes have been separated into concentrates of compound types by exhaustive percolation through silica gel. Narrow percolate fractions were characterized by measurements utilizing especially refractive index, carbon-hydrogen ratio, viscosity, and ultraviolet and infrared spectra. The various correlations indicate that these lubes are composed primarily of five characteristics, paraffin-naphthenes, condensed naphthenes, aromatic - naphthenes, naphthalenes, and higher-condensed aromatics. Comparison of viscosity characteristics and molecular-structure data indicates that viscosity index is closely related to paraffinicity and is adversely affected by increasing cyclization.

Investigations Concerning the Composition of Asphaltic Materials

R. N. TRAXLER and H. E. SCHWEYER, Refining department. The Texas Co., Port Neches, Tex.

BECAUSE a quantitative determination of the specific chemical compounds present in bituminous substances is not possible, a procedure has been developed which separates asphaltic materials into three fractions identified as asphaltics, paraffinic oils, and cyclic oils. The amount of each fraction together with the refractive index of the fluid components satisfactorily describes the nature of an asphalt and offers valuable information concerning the behavior of the material.

Component analyses for a number of different bituminous materials and the distribution of sulfur in components of asphaltic residua are given. A procedure is outlined for determining the refractive index of dark-colored or viscous asphaltic materials.

Chemical State of Vanadium in Santa Maria Valley Crude Oil

DAVIS A. SKINNER, research department, Union Oil Co. of California, Wilmington, Calif.

THE vanadium content of Santa Maria Valley California crude is about 0.022 per cent, expressed as the metal. Comparison of absorption spectra of extracts of the crude with literature spectra of pure compounds showed the element to be present in the crude as a vanadium porphyrin complex. Similar spectra have been reported by others investigating foreign petroleums. Extractive fractionation of the crude demonstrated that the complex was largely associated with the asphaltic components.

The complex was not water-soluble but was soluble or dispersible in the oil. It was not removed or affected by electric dehydrating or desalting. It was stable at 110° C., but was changed when the crude was thermally cracked at about 450° C.

Characterization of Petroleum Residua by Vacuum Flashing

P. H. JOHNSON and K. L. MILLS, Phillips Petroleum Co., Bartlesville, Okla.

THE trend toward utilization of heavier petroleum fractions has found the industry lacking in tools for characterization of these high boiling materials. Low-pressure vacuum flashing has been used to separate heavy gas oils and asphalts for further characterization and study. Results of this work, covering four crudes representing a fairly wide range of hydrocarbon type, are presented in the form of correlations of the various characteristics with boiling range and product yield. Vanadium and nickel contents of the atmospheric-topped crudes are shown, the V_2O_5 content ranging from less than 10 to 90 p.p.m. The metal content of a commercial vacuum gas oil is discussed.

Mechanisms of the Reactions of Aliphatic Hydrocarbons

LOUIS SCHMERLING, Universal Oil Products Co., Riverside, Ill.

IN general, the large variety of reactions of the aliphatic hydrocarbons can be divided into two classes: (1) Those which take place in the presence of acid-type catalysts, such as the Friedel-Crafts metal halides, on the one hand, and acids such as sulfuric acid and hydrogen fluoride, on the other, and (2) those which occur thermally or are induced by peroxides. It is the object of the present paper to show that the reactions of the first class can best be explained as occurring by way of a carbonium ion, usually chain mechanism, while reactions of the second class involve free radicals. It will be shown that by making a few plausible assumptions and by setting up certain principles, now generally accepted, of the behavior of carbonium ions and free radicals, the difference between the two classes of reactions can be readily understood.

Dehydrogenation of Methylcyclopentane Over Chromia-Alumina Catalysts

HEINZ HEINEMANN, Houdry Process Corp., Marcus Hook, Pa.

THE dehydrogenation at atmospheric pressure of methylcyclopentane over chromia-alumina catalysts in the presence of hydrogen and small amounts of benzene gives better yields of mono-olefins and lower coke deposits than either dehydrogenation at reduced pressure in the absence of hydrogen and benzene, or dehydrogenation in the presence of hydrogen or benzene individually. Treating the catalyst with benzene is not as effective in reducing coke as charging benzene with the feed but gives larger yields of desired products. More than enough hydrogen and benzene is produced in the process to make the process selfsufficient for these materials.

Hydrogen Fluoride Extraction Of High-Sulfur Virgin Petroleum Stocks

A. P. LIEN and B. L. EVERING, research department, Standard Oil Co. (Ind.), Whiting, Ind.

INCREASING use of high-sulfur crude oil has accelerated the search for improved methods of desulfurization. Hydrogen fluoride holds much promise in this respect, and was studied in detail for various petroleum stocks. Desulfurization is postulated to take place through the formation of sulfur - hydrogen fluoride complexes which are essentially insoluble in the hydrocarbon phase but completely miscible with excess-liquid hydrogen fluoride.

The reaction is fast, and short contact times are adequate to establish equilibrium; clean-cut separation into extract and raffinate phases is also rapid. Increasing the amount of extractant increases desulfurization; the ease of desulfurization, however, decreases with increasing boiling point of the stock. Temperature changes have relatively little effect up to 65° C.; above this level, desulfurization decreases sharply. Dilution of hydrogen fluoride with water results in markedly decreased desulfurization. Boron trifluoride activates hydrogen fluoride to produce a stronger acid and thereby to remove the more difficulty extractible sulfur compound.

Along with the sulfur compounds certain high-molecular weight aromatics are also extracted. In addition to desulfurization, hydrogen fluoride acts specifically on petroleum stocks to improve the lead response to gasoline, to produce essentially sweet kerosene, to improve the cracking characteristics of gas oil, to increase the viscosity index of lubricating oil, and to lower the carbon residue to total crude.

Liquid-Vapor Equilibrium Relations in Binary Systems. The Propane-Hydrogen Sulfide System

W. B. KAY and G. M. RAMBOSEK, present address: Stanolind Oil & Gas Co., Tulsa. Ohio State University, Columbus.

THE P. V. T. relations at the liquid-vapor boundaries of the propane-hydrogen sulfide system were derived from measurements of the P-T border curves of a series of mixtures ranging from nearly pure propane to nearly pure hydrogen sulfide. The experimental measurements cover a temperature and pressure range from 32° F. and about 300 lb. per sq. in. to the highest temperature and pressure at which a liquid and vapor phase can coexist. A minimum boiling azeotrope is formed whose composition varies from 20.25-mole per cent propane at 200 lb. per sq. in. to 5.7 per cent at 1,200 lb. per sq. in. Some evidence was obtained of the existence of isothermal retrograde condensation of the second kind over a limited temperature and composition range.

Oxidation Reactions as Related To Hydrocarbon Structure And Engine Knock

CECIL E. BOORD, KENNETH W. GREENLEE, and JOHN M. DERFER, Ohio State University, Columbus.

THE free-radical chain-reaction mechanism for the oxidation of hydrocarbons has been outlined in full detail. Like all other chain reactions it passes through initiation, propagation, and termination phases. The point of attack is through the hydrogen atoms of the hydrocarbon. The initiation is assumed to involve all types of hydrogen; primary, secondary, and tertiary, in the order of their numbers and relative reactivities.

The propagation phase involves a complex sequence of stepwise reactions. In the course of this sequence three new free radicals are produced for each carbon atom oxidized through the primary stage of its combustion. If the oxidation is carried through both the primary and secondary stages of combustion, the total number of new free radicals is five. The number of new free radicals determines the degree of branching of the chain reaction.

The termination phase functions in the same manner as in other chain reactions.

Three factors unite to determine the velocity of the combustion and hence the combustion ratio:

1. The initiation rate, dependent upon the relative reactivity of the three kinds of

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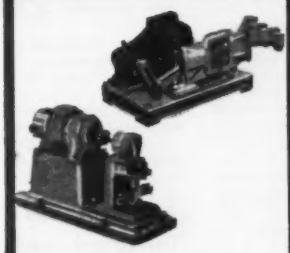

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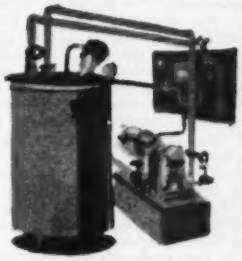

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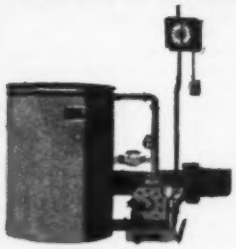

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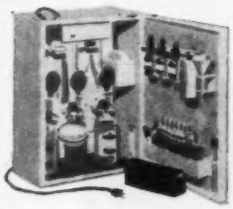

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3. The peroxidation of tertiary free radicals leads to the deactivation of large segment of the hydrocarbon molecule as a ketone, requiring reinitiation before the combustion can continue.

On the basis of the reaction mechanism described it is possible to explain the following points:

1. High critical-compression ratios for paraffin gases.

2. Low critical-compression ratios for the higher normal paraffins.

3. The high values for highly branched paraffins.

4. The fall of critical-compression ratio with increase in intake-manifold temperature.

5. The basis for dual-fuel ignition in the gas-diesel engine.

6. The basis for rich-mixture performance.

7. The high critical-compression ratios for aromatic hydrocarbons.

8. The high blending octane numbers of monoolefins and the fact that they stand in the order of their olefin type.

Antiknock Effectiveness of Tetraethyl Lead in Various Pure Hydrocarbons

WANDA I. ZANG and WHEELER G. LOVELL, Ethyl Corp., Detroit.

THE effectiveness of tetraethyl lead in increasing the antiknock level of four groups of pure hydrocarbons—the paraffins, naphthenes, aromatics, and olefins—is correlated on the basis of data available from the A.P.I. Research Project 45.

To paraffins and naphthenes the addition of a given amount of tetraethyl lead results, generally, in a constant-percentage gain in performance number regardless of the clear antiknock level or engine operating conditions. The effectiveness of the addition of tetraethyl lead to aromatics and olefins is variable, but may be related in fairly simple ways to the molecular structure and to the conditions of test.

Correlation of the Knock Resistance of Pure Hydrocarbons With Chemical Structure

H. K. LIVINGSTON, E. I. du Pont de Nemours & Co., Wilmington, Del.

THE octane numbers of pure hydrocarbons increase as a direct function of the oxidation resistance of the hydrocarbons. The resistance of hydrocarbons to oxidation is a function of structural factors that depend on the following retarding groups: methyl, tert-alkyl, vinyl, phenyl, and ring methylene. Rules have been formulated that permit calculation of "structural retardation factors" for hydrocarbons from chemical structure alone. These calculations permit the prediction of octane numbers for new hydrocarbons and provide a basis for further study of electronic and structural effects in hydrocarbon oxidation.

Flame Velocities of Liquid Hydrocarbons

R. E. ALBRIGHT, D. P. HEATH, and R. H. THENA, Socony-Vacuum Laboratories, Paulsboro, N. J.

THE flame velocities of 25 normally liquid hydrocarbons have been determined at various conditions of air flow, mixture temperature, and pressure. The results of an investigation of hydrocarbon structure and chain length effects showed that alkenes and aliphatic alcohols burn faster than alkanes and that branching of paraffinic chains tends to reduce the flame velocity. The addition of alkyl groups to aromatic rings showed no definite trend in that the flame velocity was reduced in two instances while no appreciable change was noted for a third. A procedure for measuring the apex angle of luminous cones was used. The method of angle measurement used gives the same flame velocity for luminous cones and shadowgraphs, and the results are in good agreement with values obtained by a total area method.

Vapor Pressure-Temperature Relationships of Sulfur Compounds Related to Petroleum

P. T. WHITE, D. G. BARNARD-SMITH, and F. A. FIDLER, Research Station, Anglo-Iranian Oil Co., Ltd., Sunbury-on-Thames, Middlesex, England.

THE vapor pressure-temperature relationships have been measured and the constants of the Antoine vapor-pressure equation evaluated for 15 alkane sulfides, 8 alkane disulfides, 9 cyclic sulfides, and 3 thiophenes. Tables of vapor pressure and temperature are given over a range of pressures from 10 to 1,500 mm. of mercury. From the results certain correlations are apparent between the normal boiling points and the B and C constants of the alkane sulfides and disulfides and their structure. The effect on the normal boiling point of substituting first one and then a second sulfur atom into a hydrocarbon chain has been demonstrated.

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Use has been made of the Antoine constants to calculate the latest heats of vaporization of the various sulfur compounds at their normal boiling points.

Effect of Boron or Silicon Compounds in Gasoline Combustion

E. C. HUGHES, S. M. DARLING, J. D. BARTLESON, and A. R. KLINGEL, JR., Standard Oil Co. (Ohio), Cleveland.

THE operation of gasoline engines on either leaded or unleaded fuel leads to thin combustion zone deposits. As these deposits increase to an equilibrium, the octane requirement of the engine also increases. It is shown that borates, borines, ethyl sulfate, and silicone in leaded gasoline will largely prevent this increase in octane requirement This is correlated with the difference in catalytic effect of the oxides of boron and silicon, lead sulfate, and the components of the combustion-zone deposits on the oxidation of n-heptane. The observations of the effect of these deposits on octane requirement may be explained by catalytic rather than thermal-conductivity theories.

Partial Combustion of Methane With Oxygen

R. MUNGEN and M. B. KRATZER, Stanolind Oil & Gas Co., Tulsa.

THE partial combustion of methane with oxygen at 300 lb. per sq. in. gage has been studied on a pilot-plant scale. The independent variables given primary attention were the oxygen-to-carbon feed ratio, the preheat temperatures of the feed streams, and the space velocity.

The reaction is assumed to proceed in two steps—a primary reaction when carbon dioxide and water are the main products of the reaction of methane and oxygen followed by reforming of methane with carbon dioxide and water to carbon monoxide and hydrogen. The reforming reaction appears to be the rate-controlling step in the process. Equilibrium was not attained under the conditions employed. The calculated final reaction temperatures ranged from 2,000° to 2,500° F.

Alcohol-Water Injection in Automotive Engines

J. C. PORTER and RICHARD WIEBE, Northern Regional Research Laboratory, Peoria, Ill.

THE octane-number increase obtained with ethanol depends on the amount of alcohol (up to 26 per cent), the composition and the octane level of the fuel, and the composition of the alcohol-water mixture. The upper octane limits for alcohol fuels appear to be approximately their research and motor method ratings. Reference and sensitive reference fuels give the highest octane gain when alcohol is added, but highly cracked stocks give the lowest. Commercial gasolines fall in between. Preliminary investigations appear to show that the presence of sulfur in certain gasolines does not affect the octane gain with alcohol. By slightly retarding the spark advance it is possible to obtain knock-free operation in a 10 to 1 General Motor Co. high-compression test engine mounted in a 98 Oldsmobile, using a good-grade premium gasoline and a 50-50 alcohol-water mixture. Average results of combined city and county driving in this case indicate a mixture consumption of about 1 per cent. With a lower rear-axle ratio, consumption increased to 1.6 per cent, however, the consequent fuel economy overshadowed the extra cost of the mixture.

BOOKS

ACTIVE CARBON. By John W. Hassler. Published by Chemical Publishing Co., Inc., Brooklyn. 384 pp. $7.

This text, prepared for research workers and operators in industry, represents a well-balanced treatment between the chemistry and physics of active carbon and its multitudinous applications. The writer has drawn upon 35 years of personal experience with the manufacture and marketing of active carbon. One of the best chapters is that dealing with the preparation of active carbon, with more than 98 references cited. The author reviews the theories of active carbon and devotes considerable space to the theories of adsorption from mixtures, heat of adsorption, chemistry, and physics of the active-carbon surface. Theories of contact catalysis are carefully analyzed. Under the section on experimental methods, considerable attention is given to the laboratory techniques involving both gas and liquid-phase adsorption.

GEOLOGY OF SOUTHWESTERN SANTA BARBARA COUNTY, CALIFORNIA. By T. W. Dibblee, Jr. Published as Bulletin 150, Division of Mines, State of California Department of Natural Resources, San Francisco. 95 pp. plus 9 separate plates. $5.

This bulletin contains a history of the early days of the county. It describes the geographic features, geomorphology, stratigraphy, structure, geologic history, and mineral resources. Three important oil fields are described, Capitan, Lompoc, and Zaca. The geology of the area is described in great detail and graphically shown on colored lithograph maps of the Point Arguello, Lompoc, Point Conception, Los Olivos, and Gaviota quadrangles. There are also economic maps, structure sections, areal maps, tectonic maps, and stratigraphic columns. The report also contains aerial photographs, and pictures of various structures in the area.

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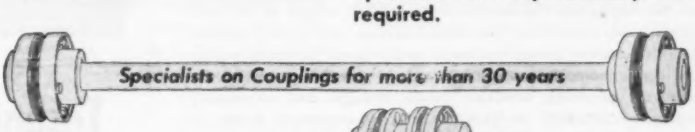

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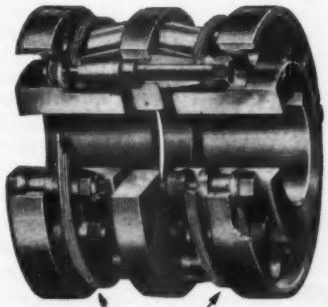

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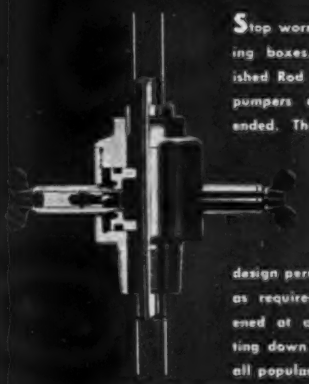

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Metallurgical Factors Affecting
DRILL-COLLAR PERFORMANCE

A review of the present processing of drill collars with special reference to metallurgical factors which have a profound effect on their trouble-free service.

by R. J. Stoup

IN considering the metallurgical requirements of a given product, it is by no means unusual to discover that the designer or user is confident his problems are less capable of satisfactory solution than those in other fields. For example, those concerned with the service of tool joints, drill pipe, or wire rope all feel their difficulties are unique and need special steels and/or distinct methods of processing.

In certain respects this is undoubtedly true; however, there are fundamental principles which apply to all steel products; and, in many cases, the differences of which the user is so conscious turn out to be basically alike to the metallurgist.

In examining the necessary requirements for oil-field items, there is sometimes a break in the line of communications; and the metallurgist gets a false idea of what the user wants or thinks he needs. It is necessary to know the illness before a medication can be prescribed. The reverse is also to be found and the designer or user is not always familiar with the latest developments in the scientific study of the properties of metals and alloys.

Use of drill collars in rotary-drilling strings has undergone a process of evolution by trial-and-error methods since early in the development of rotary drilling. Of particular significance through the years has been the discovery that straight heavy-walled tubular sections just above the bit are beneficial in two ways. First, the rate of drill penetration is increased. Second, the number of drill-pipe failures is reduced.[1]

Nonmetallurgical Factors

Without minimizing the importance of sound metallurgical practice in the manufacture of drill collars, it seems only fair to point out some of the other influencing conditions which can counteract the finest processing. One of these is abuse or mishandling in the field. It is suggested that the A.P.I. sponsor a code of recommended practice for care and use of drill collars following the precedent set by similar codes on other oil-field items, such as pipe and sucker rods. Another aspect is the matter of proper joint design and application.

R. J. Stoup was born in Pittsburgh in 1909 and was graduated by University of Pittsburgh in 1931 with a degree in metallurgical engineering. He started with Spang-Chalfant Division of The National Supply Co. in 1936 as assistant metallurgist in the research department. At present Stoup is metallurgical engineer for Spang-Chalfant—principally concerned with general metallurgical problems of seamless pipe as well as drill collars and sucker rods. Portion of a paper presented at A.P.I. Division of Production meeting, Amarillo, Tex., March 21-23, 1951.

No matter how satisfactory the current A.P.I. connections might be, if they are misapplied the stress imposed will be more than the finest material can withstand. Fig. 1A illustrates the cross section of a 4½-in. A.P.I. internal-flush connection applied to 6¼-in. diameter collar with 2¼-in. bore. Fig. 1B shows the same size collar with the 3½-in. A.P.I. full-hole type.

It seems obvious that the selection of these connections for the outside diameter and bore involved has resulted in one case in sacrificing the box section; and, in the other, thinning the wall under the pin threads. While these might seem far-fetched as examples, in practice similar unsound applications have been observed with much resultant grief to the operator. What happens, of course, is that the party responsible for the drill stem did not realize that the tool-joint connections of the pipe are not necessarily suitable for the collars.

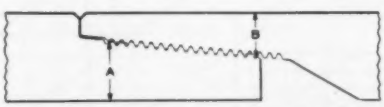

Fig. 1A—Cross-section of internal-flush drill-collar connection.

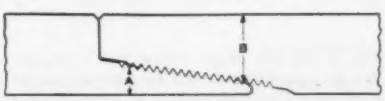

Fig. 1B—Cross-section of full-hole type connection.

Apparently what is needed (at least as a first approximation disregarding considerations such as section moduli) is to equalize the A and B dimensions. A chart permitting selection of the best balanced A.P.I. connection on this basis is shown in Fig. 2. Here, using outside diameter as one coordinate and inside diameter as the other, areas have been plotted within which there is one best-balanced joint. Following this will avoid an excessive unbalance between the strength of box and pin members.

The chart has another use inasmuch as, from it, it is possible to determine when the collar should have a new type of connection recut after cylindrical wear has reduced the outside diameter. For instance, according to the chart, a 6¼-in. diameter by 2¼-in. bore collar should start with a 4½-in. A.P.I. full-hole connection, but this should be replaced with the 4½-in. A.P.I. regular when worn under 5⅞ in. Employment of the chart on other sizes may extend the useful life of the collar.

General Manufacturing Considerations

One very important criterion governing the selection of a steel or method of processing is economy, and ultimate choices are controlled by final least cost of a product which will give satisfactory performance. It is the nature of the drill-collar market that no company of any economical manufacturing size could afford to stay in business on drill collars alone.

To be realistic about the manufacture of collars, it is necessary to recognize that companies making drill collars also produce other items. They will, therefore, use a method of manufacture best suited to their own facilities regardless of the fact that there may be inherent difficulties in the procedure. From this standpoint, hard and fast rules cannot be laid down as to the single best processing. However, there are still certain basic principles which cannot be violated

without expenditure of inordinate effort in control and testing.

As a start, the drill-collar stock should be made of fine-grained killed steel cast in big-end-up hot-topped ingots to secure soundness, uniformity, and freedom from piping. In original first processing avoidance of flakes due to hydrogen should be aided by attention to details of melting practice and a slow first cooling of the steel.

Good melting and pouring practice will keep inclusions to a minimum. However, it is to be recognized that all commercial steels will have some minor nonmetallics. Such inclusions, particularly those hard and sharp-ended, can conceivably act as stress raisers under alternating loads when they fall just at the finished surface of the threads, but lacking this unfavorable location their effect is negligible.

Electric-furnace steels are undoubtedly more free of inclusions, on the average, than basic open-hearth; but, in the author's opinion, the extra premium of cost is unjustified for drill collars. The reliability of the steel maker is a far greater protection against untoward deviations.

As far as development of mechanical properties in the finished article is concerned, certain users seem to lay great stress on the chemical composition of the steel and are quick to point out minor deviations from published analysis ranges. It may come as somewhat of a shock to the nonmetallurgist to be told that a great many apparently widely different types of steel are pretty much equivalent.

In the ordinary heat-treated steel the utility of which depends primarily upon mechanical properties developed by controlled heating and cooling, such properties are essentially conferred only in an indirect way by the alloying elements. Chemical composition is important in steels for corrosion-resistant service, such as sucker rods, because corrosion is a chemical attack. It counts in steels for high-temperature service, such as still tubes, because stability at elevated temperatures is involved. It counts in steel for very low temperatures although we are not sure just why.

However, ordinarily as long as a certain attribute known as "hardenability" is maintained, the actual elements used to obtain it are unimportant. The study of hardenability including ways of measuring it and the effect of various elements upon it, has been a prime concern of the metallurgist and metallographer for the past decade and some very fruitful developments have emerged.

Forming of the Collar

Prior observation of manufacturing practice used to produce long slender shapes such as collars leads to the conclusion that there are three workable alternatives for forming the stock: forging, rolling into a solid round, and seamless piercing. Of these three it seems to this observer that forging, perhaps because of its priority, has been overestimated especially from the quality standpoint. It further appears the possibilities of seamless piercing have been inadequately explored.

Length requirements of collars, which is only a minor restriction to rolling, impose a difficult condition when forging drill-collar stock to shape. Starting with perhaps an 8 or 10-ft. section, the raw material is heated to the maximum working temperature short of melting the steel. It is then kneaded under a press in the open air until it is too cold to deform easily; then, if necessary, it is reheated and the cycle continued until the collar is finished. Compare this with rolling where the requisite shape is completed in a matter of a very few minutes.

A seamless pierced drill collar offers some manufacturing advantages since the hole will be formed at the time of rolling and avoid the slow, arduous cold boring of a rolled or forged round. Cold boring is somewhat more precise as the inside diameter of a pierced tube may wander slightly and on the average perhaps deviate more from the center line of the collar. However, the bore in a pierced collar will never approach serious thinning of the wall since tolerances of 12½ per cent eccentricity similar to oil-country tubular goods are easily maintained. As long as sufficient passage is afforded wireline coring equipment and survey instruments, this does not seem a serious drawback.

At this point it might be well to discuss the "balance" of a drill collar. There are those who feel that if the collar is not absolutely concentric the net result in service will be a dynamic unbalance and a deviated hole. However, in view of the many other factors involved in the straightness of the hole, such as bit action and angle of the formation, ascribing well

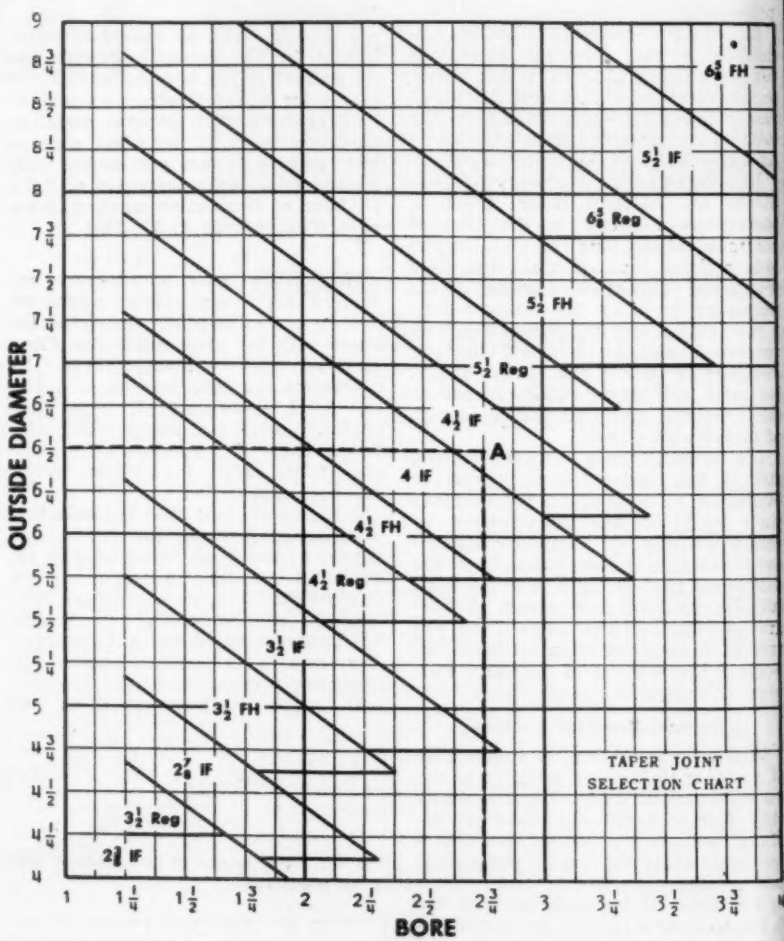

Fig. 2—To use chart, follow this example: Given a drill collar 6½-in. outside diameter by 2¾-in. bore, what is the best connection to use? Enter left side of chart at 6½ in. and go horizontally to intersection of vertical erected at 2¾-in. bore. This intersection "A" occurs in the area marked "4½-in. Internal Flush." Therefore, this particular connection would be the most symmetrical for the given case.

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Q Why use *two* rollers in contact with each kelly face? Wouldn't one large roller on each face serve as well?

A Definitely not. Two rollers give vertical stability to the kelly—prevent it from gyrating and wobbling—hold it steady at *all* table speeds and under *all* drilling conditions, rough or smooth

One roller on each face would not give this vertical stability . . . would permit the kelly to wobble and gyrate over a wide arc—which, in turn, would not only reduce drilling speed and efficiency, but would also cause severe strains on table bearings, swivel bearings and pipe connections.

Another important point—one roller for each face would necessitate the rollers being quite large in order to prevent "corrugating" the kelly. Large rollers mean high inertia—are slow to start, slow to stop and prevent instant response to kelly feed. But by using *two* rollers against each face, ample driving surface is secured with rollers that are compact, quick-turning, quick-stopping. Result—*instant response to the most delicate bit feed!*

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A Absolutely! In fact, the Baash-Ross Hex Roller Kelly Bushing is designed so that all you do to adjust the fit is lift out the roller assemblies and remove one or more shims below each assembly. Working diameter is reduced exactly 1/32" for each shim removed, so it's easy to make accurate adjustment without complicated operations.

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deviations to the collar alone does not seem sound reasoning. In the author's opinion the importance of balance in a drill collar has been greatly overemphasized.

Heat Treating the Collar

One very pertinent question is: "Do drill collars have to be heat treated?" (Heat treating is defined as the development of desired mechanical properties by a combination of heating and cooling in the solid state.) The answer for all but the very mildest drilling is undoubtedly "yes." To begin with the collar is only one unit in the drill string and must be connected at each end to something else—a bit, another collar or sub, or a tool joint. Gignoux[2] examined the A.P.I. full-hole connection and concluded the service stresses in a tool joint approached 75,000 psi. at the last engaged thread. Because of the profound influence of such variables as roughness of threads, type of thread dope, makeup torque at the rig, and thread deviations, this could perhaps vary over a wide range; but, in any event, it is of a substantial order of magnitude.

In addition, the connection must be made and broken many times in the course of drilling a well which involves wear resistance. On the static stress there is imposed an alternating dynamic stress of unknown magnitude during rotation. To resist these total stresses, a fairly high level of mechanical strength seems indicated —something on the order of at least 110,000-psi. yield strength, 140,000-psi. tensile strength, and 280 Brinell.

The mechanical strength mentioned is not particularly required at the outside surface, but rather at a location some distance toward the bore. To verify this we need only observe the service failures of drill collars.

The most common drill-collar break starts at the pin end near the last full thread at the shoulder and a progressive fracture severs the pin. Less frequently the crack starts in the box and, by a similar action, travels to the outside. Therefore it seems the properties at these locations are more important than at the surface (which are usually pretty good anyway). The depth of this critical location varies with the size of collar and the pitch diameter of the thread, but in many common cases is just about 1½ in. in from the heat-treated diameter. It seems logical to take the properties of this location as an important criterion of drill-collar quality.

Steel is basically iron with a little carbon. At the temperature of 1,450° F. and over, the carbon is all in solution—there are no carbide particles. If the steel is then cooled, the iron changes its crystal form and the carbon is thrown out of solution as hard particles of iron carbide dispersed in a soft matrix of iron. If the cooling is slow, the carbides are few and large and the conglomerate offers only slightly interrupted paths to internal shear; and under applied stress, such as the 6,600-lb. load of a Brinell test, the steel is soft. When rapidly cooled, the same material has an abundance of small, widely scattered particles to interrupt shear paths through the matrix and the steel is hard. By controlling the cooling the properties of the steel may be adjusted to run the gamut between soft iron wire and spring steel.

There is an economical percentage of other chemical elements which will give full hardening at the critical locations and beyond which the additions are of little value. For steel procurement it is believed best to specify the steel to minimum hardenability rather than limit the chemistry ranges. This is done by ordering to the so-called "H-band" specifications. The steel melter will then make a hardenability test on the material before shipping; and the collar maker, by comparing the test results with what experience has proved to be the best hardenability for drill collars, can plan heat treatment in an orderly way.

Most drill collars made today apparently are of the American Iron and Steel Institute 4,100-series type, i.e., 1 per cent chromium, 0.20 per cent molybdenum at the 0.40-0.50 per cent carbon range. Other analyses known to have been used are the 3,100 nickel-chromium type and the 8,600, 8,700, and 9,800 nickel-chromium-molybdenum types. We have no information that would lead us to believe any one steel grade has been particularly outstanding in field results.

The foregoing discussion as to economic factors governing the selection of steel assumed a highly agitated water quench. It is quite true that other methods of cooling can be used—specifically, either air cooling commonly called "normalizing," or oil quenching, both being followed by a temper. The common disadvantage of both of these is that their substantially slower rate of cooling demands even more alloy than was mentioned under water quenching. Such extra alloy additions are expensive and in addition at the present time are needed in vital war material.

A typical heat-treating cycle on a 6¼-in. diameter collar might be as follows:

Heat to 1,600° F. in 5 hours.
Hold at temperature 4 hours.
Water quench to 400° F.
As soon as equalized place in warm furnace.
Heat to 1,150° F. in 3 hours.
Hold at 1,150° F. for 4 hours.
Air or water cool.
After straightening, stress relieve at 1,050° F. for 3 hours.

Testing and Inspection

One all-important criterion of the quality of heat treatment in relation to service is the hardness of the collar 1½ in. from the outside surface Inasmuch as it is inconvenient to cut that deep on the blank (of course, tests on the as-treated end have no significance), this is a poor control point for routine testing. An indirect relation can easily be established by taking several collars of steel to the very minimum hardenability expected and, after treatment, cutting a disk for hardness survey. The relation between surface hardness and hardness at the 1½-in. point (or any location) can then be easily established. Once the correspondence is found, the inspector is in a position to evaluate the hardness at 1½ in. by surface hardness — a value more readily found.

Izod Impact Strength

A second value on which minimum control limits might be set is the Izod impact test, a determination much misunderstood in the field. In this test a notched longitudinal specimen taken from the wall thickness of the drill collar is clamped at one end so that the other end projects into the path of a heavy pendulum. The pendulum is raised to a position high enough to break the sample and then released. By measuring the swing of the pendulum before and after impact, the amount of energy required to break the specimen is calculated. This is measured in foot-pounds.

In general, it might be said that the notched-bar test serves to distinguish brittle from ductile materials. However, when one comes to examine the background of this test, it is interesting to find that while it has been in use for 50 years or more (longer than drill collars), it is far from being completely understood. It has been the subject of much controversy, although it has been intensely studied by competent engineers and metallurgists and the results of innumerable experiments have been given wide circulation.

Certain general conclusions have been drawn; e.g., it is agreed the conditions under which impact tests are made are seldom or never duplicated in service. This is generally true of all products to which the test has been applied, including drill collars. It is known the test results are not directly usable in design, but are comparative and then only under controlled conditions. One finding has, however, been rather conclusively established, i.e., that there is no correlation between kind of impact values and endurance limit in fatigue.[3]

However, it should be noted, in view of the fact that there is no established correlation between impact strength and endurance limit, it is difficult to see how a consideration of impact values can shed any direct light on the ultimate effect of such vibratory stresses.

It is nevertheless true that different steels give different impact values or the same steel, treated in a differen way, shows variations. If we can

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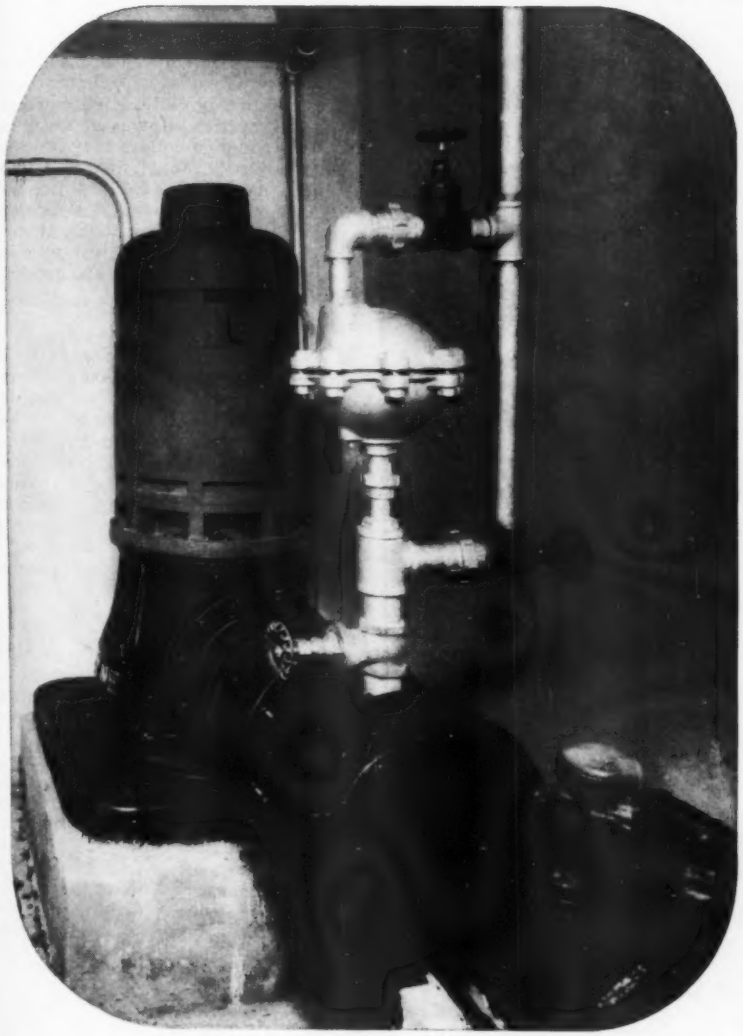

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ascertain the cause of the differences, it may shed some light on the test and give information obtainable in no other way. It has been found there are a number of minor variables such as grain size and the way the steel is cooled from the temper which have a direct influence on the results of the test. However, if we consider two halves of the same piece of steel given different heat treatments to the same hardness, the treatment which hardens the steel more uniformly gives the better impact value. From the great amount of work that has been done on hardened and tempered steels, it can be stated quite definitely that notched-bar impact strength is a "structure-sensitive" property; in other words, it is greatly influenced by the manner in which the components of the steel are distributed.

There is no doubt the type of heat treatment has a pronounced influence on the straightness of collars. The milder quenches such as air and oil do not set up such drastic temperature differentials as water, and the collar during heat treatment remains straighter. However, it has been noted that water quenching in the bored condition with violent agitation results in a straighter product than water quenching in the solid. This is conceived to be due to the fact that the steel is more uniformly hardened.

The detrimental influence of warping during heat treatment can be largely overcome by a stress-relieving cycle after straightening. Since straightening involves bending the outer fibers beyond the elastic limit, it induces stresses around the circumference that might affect service unfavorably. Under severe drilling conditions the locked-in stresses might tend to spring the collar crooked. A stress-relieving treatment after plant straightening, involving heating the collar to slightly below the tempering temperature and holding several hours, relaxes these stresses and obviates field straightness difficulties. However, with best drilling practice collars may occasionally become crooked due to circumstances beyond control. In this case field straightening with a portable hydraulic press is frequently done at the rig, but lacking a stress-relieving treatment such measures are generally only temporary.

Conclusion

We have examined some of the factors influencing service performance to drill collars. The problem seems to resolve itself first into getting material at the critical locations of the collar of the proper hardness since hardness controls fatigue strength. Since ordinary hardness determinations are not sensitive to minor differences in structure, a notched-bar impact test may possibly be of some merit if evaluated strictly on a comparative basis. This is more important for manufacturers not making or heat-treating their collar blanks as they are otherwise at the mercy of their supplier. For those heat-treating their own blanks, this is a minor matter of control.

The requisite conditions are met in drill-collar heat treating by hardening the collar to the correct depth by using proper quenching procedure and sufficient alloys in the steel. A substantial saving in alloy and possibly in subsequent cost of the collar can be obtained by using an agitated water quench in the bored or pierced condition.

References

1. Battelle Memorial Institute, Reports to American Association of Oil Well Drilling Contractors, Drilling Contractor throughout the years 1946, 1947, and 1948.
2. Gignoux, F. C., History, Development and Application of the Full Hole Tool Joint, Drilling and Production Practice, 1934, p. 155.
3. Dolan, T. J., and Yen, C. S., Some Aspects of the Effect of Metallurgical Structure on Fatigue Strength and Notch Sensitivity of Steel, Proceedings A.S.T.M., 1948, Vol. 48, p. 664.

Continental Buys Firm

LOUISVILLE.—Continental Oil Co. has purchased National Oil Corp. of Kentucky, a large distributor of petroleum products, which also has dealer outlets in Indiana.

Properties consist principally of a large combination water terminal and bulk plant at Louisville, and bulk-distributing plants at Carrollton, Eminence, and La Grange, Ky.

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after Fabrication

HOT DIP GALVANIZING
PICKLING & PAINTING

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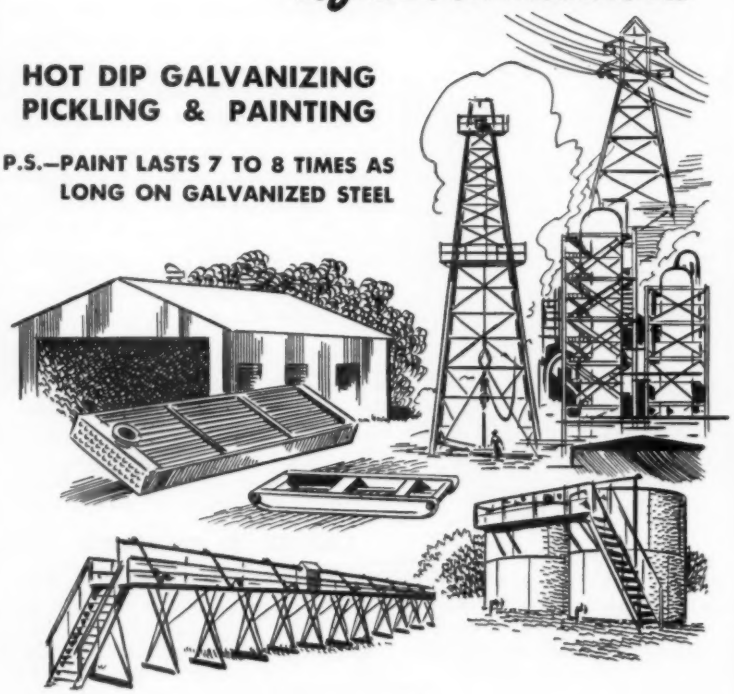

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In soft formations the protrusion regulator spring forces the core cutter head out ahead of the drilling bit, protecting the core from the washing action of the mud and from breakage — assuring maximum recovery of clean, unbroken cores.

When streaks of hard formation are encountered, the protrusion regulator spring permits the cutter head to retract within the drilling bit—protecting the cutter head from too much weight.

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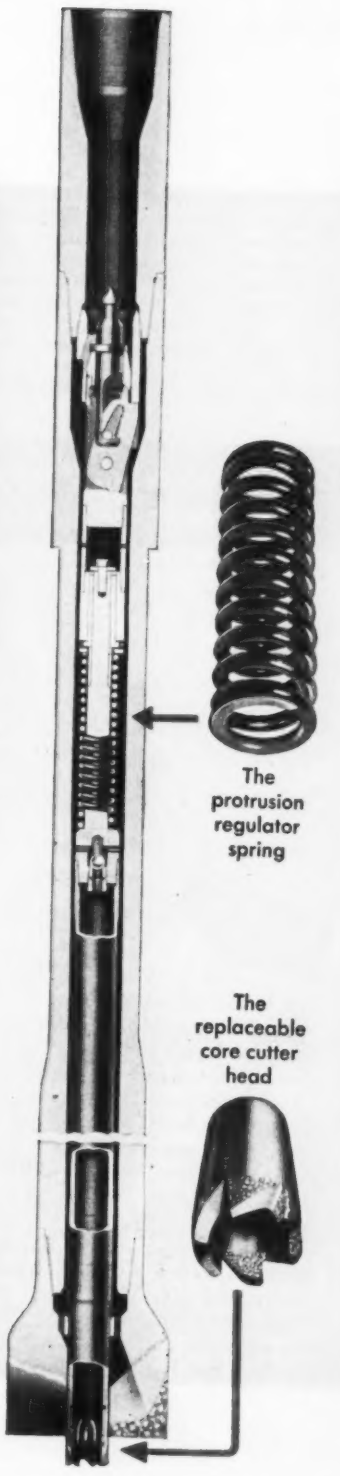

The protrusion regulator spring

The replaceable core cutter head

REED ROLLER BIT COMPANY

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Sodafining

(Continued from page 89)

against a maximum oxygen specification of 0.2 per cent is not suitable.

If consumption of the special grade of nitrogen must be limited, ordinary nitrogen, refinery inert or light hydrocarbon gas is used for preliminary purging of containers, with replacement of such protective gas in the vapor space with Seaford or Prepurified nitrogen because of its established efficacy for long-time protection. For samples to be caustic washed the reagent is added to the container before purging.

Caustic washing usually involves washing with 10 per cent of 15° B. caustic, followed by three 20 per cent water washes. The special nitrogen blanket must be maintained throughout any distillation or analytical techniques, as for example, in the glassware in which the peroxide number determination is carried out, until after caustic washing and inhibiting are effected.

TABLE 3

	Raw heating oil		Heating oil caustic and water washed under nitrogen	
	Under nitrogen	Exposed to air	Under N_2 until tested	Exposed to air
Mercaptan number*†	30	2.5	5	1
Peroxide number*‡	Nil	0.8		0.2
Carbon residue, per cent§	0.13	0.31		0.15
Color (T.R.)	12¾	1½		11

*Nitrogen blanketed during test. †Milligrams of mercaptan sulfur per 100 ml. ‡Gram equivalents of active oxygen per 1,000 l. §Carbon residue on 10 per cent residuum from distillation (A.S.T.M. D-189-46).

It must be emphasized that to secure accurate analytical determinations on air-sensitive samples, the precautions for preventing contact with traces of oxygen must be carried to what at first appear to be ridiculous extremes. Of course, in commercial application of the Sodafining process, this nitrogen protection is not required as there is a tight system of natural hydrocarbon vapors; and after the prompt caustic wash before air contact and immediate addition of inhibitor, the distillate is no longer susceptible to the degradation otherwise occurring.

Standard Oil Development Co. is prepared to license its patents on Sodafining on a reasonable royalty basis.

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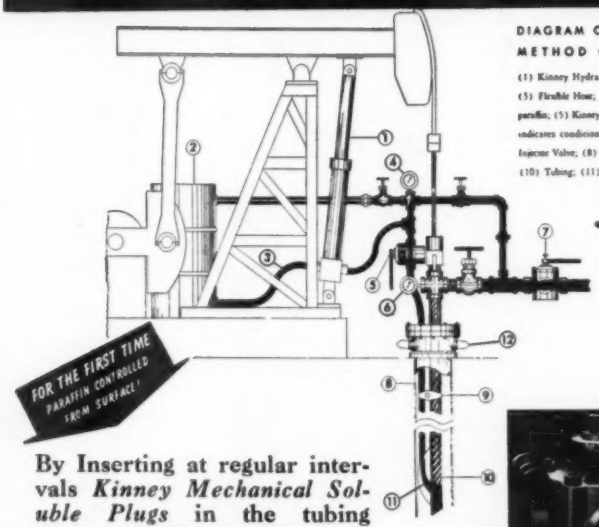
DIAGRAM OF HOOK-UP AND METHOD OF OPERATION
(1) Kinney Hydraulic Pump; (2) Supply Tank; (3) Flexible Hose; (4) Gauge, indicates removal of paraffin; (5) Kinney Plug Injector Valve; (6) Gauge, indicates condition of paraffin; (7) Kinney Plug Injector Valve; (8) 1" Tubing; (9) Parallel Clamp; (10) Tubing; (11) Crossover; (12) Parallel Head
• Production Fluid
• Dead Fluid
FOR THE FIRST TIME PARAFFIN CONTROLLED FROM SURFACE!

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Down-the-Hole Pressure Surges

(Continued from page 87)

hydrostatic and circulating pressures would exceed the strength of the formation and cause it to take mud.

It is generally recognized from squeeze-cementing, acidizing, and "Hydrafrac" operations that once a formation has been broken down it will take fluid more readily. Once this has occurred, the formation may take fluid when circulation is established, or the fluid level may drop, depending upon the strength of the formation after breakdown. It is not implied that in loss of circulation in abnormal pressure wells the formations are always fractured by the pressures in the hole, for it may be true that existing fractures are opened by the pressure.

If a mud of 14-lb. per gallon density is circulated under the conditions illustrated, then none of the surge pressures would be great enough to break down the formation. If the 16.5-lb. per gallon mud is circulated, then opening the pump rapidly would give a surge great enough to break down the formation.

The illustration given is chiefly relative to abnormal pressure drilling

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You can't beat the WECO FIG. 400

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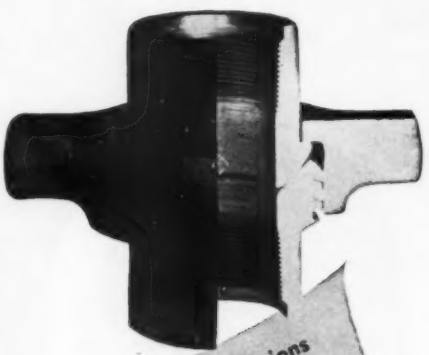
Standardize on WECO Fig. 400 for the best connections in drilling and production service. Available in sizes 2" through 10"; 4000 lb. test pressures. All parts interchangeable.



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where high hydrostatic pressures are required. However, it is believed that the surge pressures will also have an effect on loss of circulation in normal-pressure gradient drilling. Since the hydrostatic pressures are not great when this type of loss occurs, it is believed that the formations are not fractured by the well pressures. These losses appear to be due to the drilling of highly porous or cavernous zones through which mud can readily flow.

Plugging these zones is difficult. It has often been found that after plugging is accomplished, increasing the mud density slightly will again break the formation down. In such instances it is evident that the plugged hole will support only low pressures. If the surge pressures are added to hydrostatic pressure, values in excess of that which the hole will support may result.

In the drilling of the limestone and dolomite of the Permian basin, losses have frequently been found to occur immediately following a round trip with the bit. This would indicate that surge pressures due to rapidly running pipe may have caused the loss.

Attention should also be given to surge pressures when rapidly running casing. Annular clearances are usually less with casing than with the drilling strings. These surges were not measured but must be of a high order and their effect in causing a loss may easily be imagined.

In summary, whenever, the hydrostatic pressure in a well approaches the maximum which the formation will withstand, surge pressures due to pipe movement and rapidly starting pumps may cause a loss of circulation. It is believed that they should be avoided in drilling when a loss of circulation occurs or is considered likely. The data developed shows that this may be done through slowed rates of pipe movement and slow starting of circulation.

The information presented here has only touched upon a subject which needs to be fully developed. Cannon[1] has shown the effect of annular area, gel strengths, and rate of pipe withdrawal on swabbing pressures. Chaney[2] discussed the possibility that "peak pressures caused by a balled bit, rapid lowering of the drill pipe, or by sharp pulsations in pump pressure" may increase pressures above formation strength in abnormal pressure wells.

Acknowledgment

The authors wish to express their appreciation to the management of Gulf Oil Corp., Houston production division, and the Gulf Research & Development Co. for permission to publish this paper.

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2. Chaney, P. E., Abnormal Pressures and Lost Circulation, Drilling and Production Practice, 1949, pp. 145-152.

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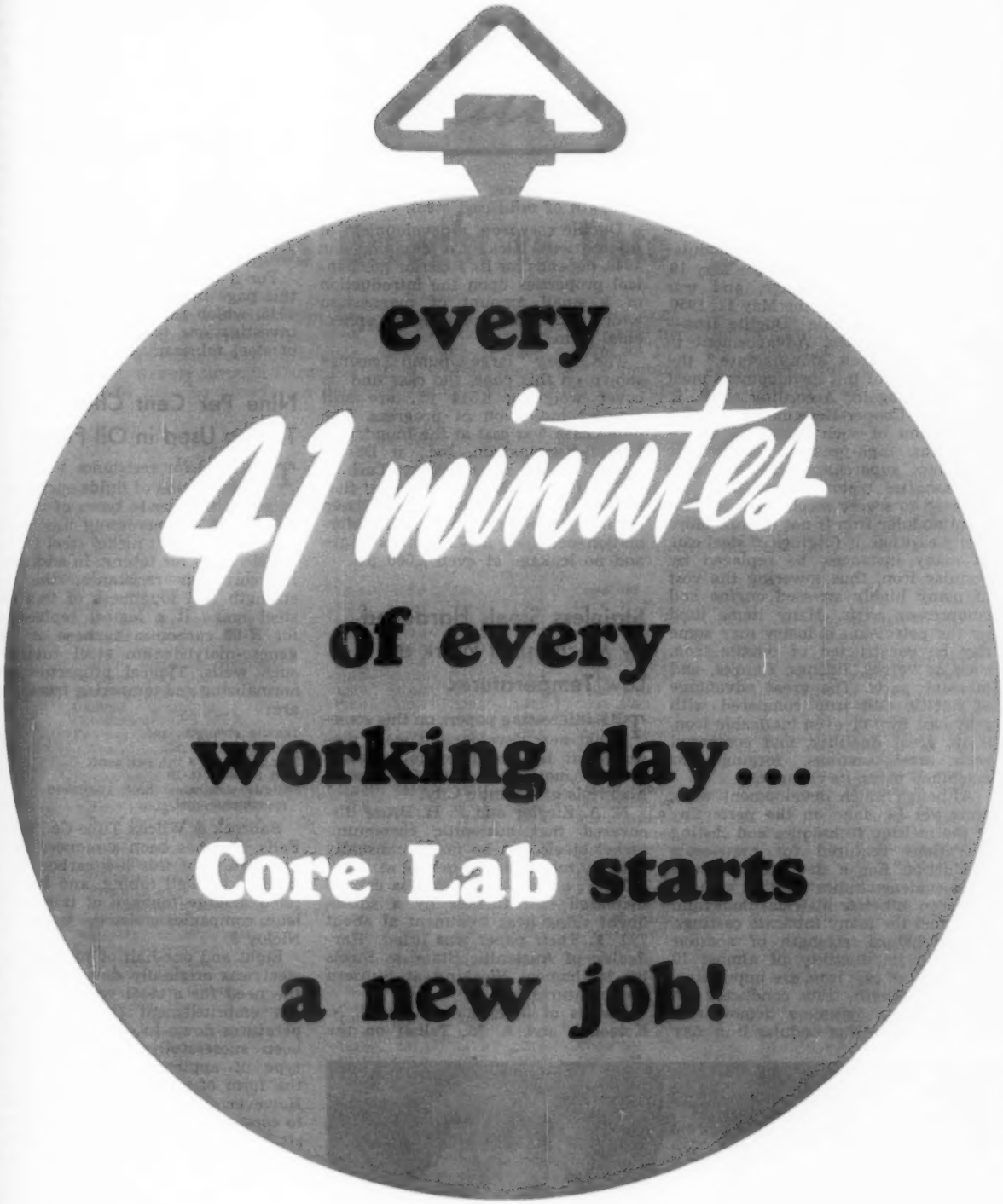

"Providing more reservoir revenue . . . through the production of more recoverable oil."

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PROGRESS in METALS

by W. L. Nelson
Consulting Engineer

Nodular Iron Gains Stature

ALTHOUGH the importance of the discovery of ductile or nodular cast iron was discussed in the May 19, 1949, issue of this page, and was again emphasized in the May 11, 1950, issue under the title "Ductile Iron—Century's Greatest Advancement in Art of Cast-Iron Manufacture," the significance of this development must be stated again. According to T. E. Eagan of Cooper-Bessemer Corp., the production of such pieces of equipment as high-pressure compressor cylinders, supercharged diesel-engine crankshafts, pistons, etc., that are exposed to severe mechanical service, from nodular iron is not far off. More costly castings or forgings of steel can, in many instances, be replaced by nodular iron, thus lowering the cost of many highly stressed engine and compressor parts. Many items used by the petroleum industry may some day be constructed of ductile iron, such as valves, fittings, flanges, and machine parts. The great advantage of ductile cast iron compared with gray cast iron or even malleable iron, is its great ductility, and compared with steel castings, forgings, or machined parts, its cheapness.

Although much development work must yet be done on the perfecting of the melting techniques and casting operations required for mass-scale production, Eagan states that there is some evidence indicating that nodular cast iron is better material than mild cast steel for many intricate castings. The 90,000-psi. strength of nodular iron and its ductility of almost 10 times that of cast iron, are impressive. Fatigue-strength tests conducted on high-pressure cylinders demonstrate that the strength of nodular iron may in some instances exceed the fatigue strength of mild cast steel.

Ductile cast iron, a development of International Nickel Co., announced in 1948, depends for its superior mechanical properties upon the introduction of a small amount of magnesium which converts graphite into a spheroidal form.

The very large pump casings shown on this page, the case and its cover weighing 8,314 lb., are still another indication of progress. The pump case was cast at the foundry of Farrell-Birmingham, Inc., at Derby, Conn., for De Laval Steam Turbine Co., of Trenton, N. J. They report that hydrostatic test results have been highly satisfactory. Only slight deformation occurred at 750-psi. pressure and no leakage at even 1,500 psi.

Stainless Steels Hardened By Mechanical Work at Low Temperatures

THE interesting papers on this somewhat new development were presented at the third annual meeting of the American Society for Testing Materials at Atlantic City.

N. A. Ziegler and P. H. Brace discovered that austenitic chromium-nickel steels can be made unusually hard by mechanical working at about —50° F. and lower. Hardness can be increased still further by a subsequent aging heat treatment at about 750° F. Their paper was titled "Hardening of Austenitic Stainless Steels by Mechanical Working at Subzero Temperatures."

Results of investigations by V. N. Krivobok and A. M. Talbot on the processing of commercial austenitic stainless steels at subzero temperatures show general agreement with those of Ziegler and Brace. Their paper "Effect of Temperature on the Mechanical Properties, Characteristics and Processing of Austentic Stainless Steels," covers the mechanical properties at subzero and elevated temperatures of steels rolled at room and at subzero temperatures. The effects of subzero and of elevated temperatures on the properties at room temperature were also determined.

For a more detailed discussion see this page in the issue of January 29, 1948, which reports one of the early investigations (1947) of this method of steel fabrication.

Upper and lower pump casings for De Laval pumps, cast in ductile iron by Farrell-Birmingham Co., a licensed producer under Inco patents.

Nine Per Cent Chromium Tubing Used in Oil Fields

THE need for resistance to the corrosive action of fluids encountered in some condensate types of oil wells has led to an increasing use of low-carbon 9 per cent nickel steel (A.I.S.I. "2800" type) for tubing. In addition to its corrosion resistance, the high strength and toughness of this alloy steel make it a logical replacement for N-80 carbon-manganese or manganese-molybdenum steel tubing in such wells. Typical properties after normalizing and tempering treatments are:

Tensile strength, psi.	120,000
Yield strength, psi.	100,000
Elongation in 2 in., per cent	30
Izod impact, ft.-lb.	70
Fatigue endurance limit (polished specimens), psi.	70,000

Babcock & Wilcox Tube Co., Beaver Falls, Pa., has been a pioneer in the application of this low-carbon nickel steel to oil-well tubing, and has supplied a large tonnage of it to petroleum companies under the trade name Nicloy 9.

Eight and one-half or nine per cent steel was originally developed to fill the need for a steel which could resist embrittlement at subzero temperatures down to —320° F., and has been successfully employed in this type of application, particularly in the form of welded pressure vessels. However, as a result of its resistance to corrosive oil well fluids, as demonstrated by field tests, a major tonnage is now being produced in the form of tubing.

In a 13,000-ft. well in Louisiana recently, some 12,000 ft. of B. & W. Nicloy 9 tubing, 2⅜-in. o.d., was employed. Its combination of strength and corrosion resistance aided materially in bringing this record-making well into production.

Nicloy 9 has also been adopted for sucker rods in certain types of wells where corrosive conditions tend to cause early fatigue failures with ordinary sucker rod materials.

Taken almost totally from the September 1950 issue of Nickel Topics of International Nickel Co.

Cost-imating

Cost Indexes Brought to Date

THE many costs published in the Cost-imating series (63 issues of The Oil and Gas Journal, October 21, 1948, weekly through December 29, 1949) may be brought to date by the cost indexes on this page. Similar tabulations and cost indexes appear each quarter in the first weekly issues of the months of January, April, July, and October. In addition, the Nelson Refinery Construction Index appears each month (first weekly issue) on the Refining page.

(Multiply the prices of Cost-imating series by these indexes)

Base: 1946 = 100

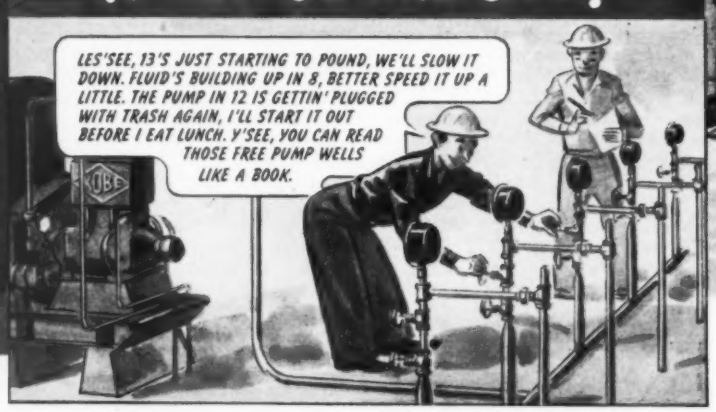
	1947	1948	1949	Dec. 1950	Reference*	Complete index appears in Cost-imating
Labor:						
Skilled construction	112.0	125.0	133.9	143.2	Eng. News Record	No. 55—Nov. 3, 1949
Common labor	115.0	131.0	140.4	152.4	Eng. News Record	No. 55—Nov. 3, 1949
Refinery construction	113.5	128.0	137.1	147.8		No. 61—Dec. 15, 1949
Refinery operation	109.0	126.0	132.9	†145.3	Survey of Current Business	No. 55—Nov. 3, 1949
Equipment or materials:				Nov. 1950		
Board, insulation, 48-in.	112.5	125.0	125.1	136.5	Code 561	
Boiler tubes, 2-2¼-in.	115.0	†135.0	140.9	148.3	Code 409.2	
Brick and tile composite	114.0	137.0	131.4	145.2	Composite	No. 22—Mar. 17, 1949
Brick, common	110.5	127.0	133.1	144.1	Code 498.1	
Brick, fireclay	114.0	126.0	131.3	155.5	Code 499	
Building materials composite	135.5	153.0	145.8	163.8	Composite	No. 22—Mar. 17, 1949
Castings, gray iron	118.5	†139.5	†141.5	169.4	Code 416.8	No. 46—Sept. 1, 1949
Castings, pipe	129.0	†180.0	173.8	....	Code 434.2	No. 46—Sept. 1, 1949
Cement	110.0	125.0	128.2	135.1	Code 509.1	No. 22—Mar. 17, 1949
Compressor	114.0	128.0	120.0	125.9	Manufacturer	No. 36—June 23, 1949
Engines (composite)	109.0	120.0	115.5	123.2	Manufacturer	No. 36—June 23, 1949
Gas	110.0	122.0	117.0	134.6	Manufacturer	No. 36—June 23, 1949
Diesel	108.0	117.0	114.0	111.8	Manufacturer	No. 36—June 23, 1949
Exchangers	†115.0	†130.0	†133.0	....		No. 2—Oct. 28, 1948
Instruments (composite)	113.0	120.0	123.1	133.8	Manufacturer	No. 34—June 9, 1949
Flow meter, mechanical	102.0	....	109.2	121.3	Manufacturer	No. 34—June 9, 1949
Flow meter, air control	....	....	132.4	146.8	Manufacturer	No. 34—June 9, 1949
Flow meter, remote	....	....	130.2	142.2	Manufacturer	No. 34—June 9, 1949
Potentiometer, 6-pt.	111.0	....	125.8	137.3	Manufacturer	No. 34—June 9, 1949
Potentiometer, air control	....	....	131.6	136.8	Manufacturer	No. 34—June 9, 1949
Pressure controller	....	....	130.2	146.2	Manufacturer	No. 34—June 9, 1949
Pressure gage	109.0	....	100.0	100.0	Manufacturer	No. 34—June 9, 1949
Thermometer, recording	....	....	118.6	129.6	Manufacturer	No. 34—June 9, 1949
Control valve	117.0	....	129.8	143.1	Manufacturer	No. 34—June 9, 1949
Insulation, asbestos pipe	118.0	122.0	130.1	180.9	Code 767	
Lumber (composite)	155.0	175.0	160.1	193.9	Composite	No. 7—Dec. 2, 1948
Cypress, C grade	155.0	178.0	213.5	255.5	Code 529-2	
Pine, Ponderoso, No. 3	140.0	176.0	159.0	....	Code 524-1	
Pine, yellow timbers	138.0	161.0	154.8	188.2	Code 522-9.1	No. 7—Dec. 2, 1948
Redwood, heart	134.0	†159.0	154.6	191.6	Code 528-3	
Motors, electric	110.0	112.7	114.0	135.3	Manufacturer	No. 31—May 19, 1949
Paint and paint materials	137.0	135.0	127.5	124.9	Composite	No. 22—Mar. 17, 1949
Paint, inside, flat	133.5	137.0	147.0	151.9	Code 531.1	
Paint, outside	150.0	†156.0	157.0	147.7	Code 532.1	
Pipe, sewer	111.5	121.5	119.1	144.2	Code 572.1	No. 22—Mar. 17, 1949
Pipe, black, ¾-in.	120.5	†148.0	152.2	158.8	Code 435.1	No. 42—Aug. 4, 1949
Pumps (composite)	118.7	129.1	131.7	144.0	Manufacturer	No. 29—May 5, 1949
Centrifugal	109.0	120.0	118.9	133.7	Manufacturer	
Reciprocating	128.5	138.1	144.6	154.4	Manufacturer	
Sand	112.0	122.0	127.4	132.1	Code 579.2	
Steel (composite iron and steel)	121.0	140.5	150.2	157.7	Composite	No. 61—Dec. 15, 1949
Plate (tank)	117.5	†144.0	144.5	150.9	Code 446.3	No. 5—Nov. 18, 1948
Sheet, galvanized	105.0	†146.0	139.0	156.1	Code 448.3	
Structural	113.5	†145.0	151.3	161.8	Code 452.2	No. 18—Feb. 17, 1949
Transformers	116.0	116.0	116.0	123.4	Manufacturer	No. 31—May 19, 1949
Marshall-Stevens equipment (only) indexes:				Dec. 1950		
Process industries (average)	121.0	131.5	131.5	142.2	Chem. Eng., Feb. 1951	Chem. Eng., Feb. 1950
Chemical	119.5	130.0	130.0	140.0	Chem. Eng., Feb. 1951	Chem. Eng., Feb. 1950
Petroleum	121.0	132.0	132.0	143.0	Chem. Eng., Feb. 1951	Chem. Eng., Feb. 1950
Electrical power	122.0	135.0	135.0	145.7	Chem. Eng., Feb. 1951	Chem. Eng., Feb. 1950
Refrigeration	129.0	141.0	139.9	155.8	Chem. Eng., Feb. 1951	Chem. Eng., Feb. 1950
Steam power	122.0	132.0	132.0	143.7	Chem. Eng., Feb. 1951	Chem. Eng., Feb. 1950
Nelson—Refinery Construction	117.0	132.5	139.6	153.4		No. 61—Dec. 15, 1949

*The reference for all codes or for composite, is "Wholesale Prices," published monthly by the Bureau of Labor Statistics, U. S. Department of Commerce. †Estimate.

It doesn't have to be this way...

. . . CAN'T BE GAS LOCKED—ISN'T BUMPING—MAYBE THE STANDING VALVE'S LEAKING—ENGINEERS SWEAR IT CAN'T BE PUMPED OFF—KNOW THE RODS HAVEN'T PARTED—GUESS WE'D JUST GOT TO PULL IT AGAIN—
BOY, HE'S REALLY SWEATIN' IT
BETCHA IT'S THAT SQUARE STANDIN' VALVE BALL AGAIN
NAW, YOU JERKS JUST RAN THE PUMP UPSIDE-DOWN WHEN I WAS OFF LAST WEEK

It can be like this!


LES'SEE, 13'S JUST STARTING TO POUND, WE'LL SLOW IT DOWN. FLUID'S BUILDING UP IN 8, BETTER SPEED IT UP A LITTLE. THE PUMP IN 12 IS GETTIN' PLUGGED WITH TRASH AGAIN, I'LL START IT OUT BEFORE I EAT LUNCH. Y'SEE, YOU CAN READ THOSE FREE PUMP WELLS LIKE A BOOK.
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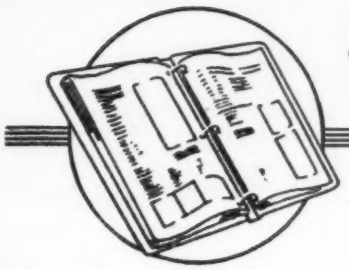

THE REFINER'S notebook

No. 66

Lubrication Greases-Classification*

THE grease-classification chart (Table 1) is not intended as a guide in the selection of a grease for a given application. Its principal purpose is to show the effect of different kinds of metallic soaps on the over-all physical properties and operational characteristics of greases—all other factors being equal.

The following remarks are pertinent to this classification:

1. **Most calcium-base greases** contain "water of hydration." Above approximately 160° F., they tend to lose this water, which is necessary to their stability, and separate into the original oil and a hard curdy soap. Below 160° F., calcium greases show good mechanical stability.

2. **Soda-base greases** give good performance at moderately high temperatures. When short-fibered or buttery, they are excellent for high-speed antifriction bearings. When made from well-chosen materials, they resist mechanical breakdown and oxidation.

*From material prepared by Shell Oil Co. on "Fundamentals of Lubricating Greases."

3. **Mixed-base greases** vary widely in performance with variations in the kind and percentage of ingredients used as well as the manufacturing methods. Mixed-base greases include the very stable, oxidation-inhibited greases used in "lifetime" lubricated bearings.

4. **Aluminum greases** maintain their consistency and texture up to the melting point. However, they may "set up" if heated above this point and then cooled. They are very "tacky" but never fibrous. Popularity enjoyed by these greases some years ago for certain applications, has been transferred to other types of greases.

5. **Barium greases** bring together many of the best characteristics of various other greases and hence are good multipurpose lubricants. However, because of their high soap content, they may cause trouble in grease-dispensing systems, in very high-speed bearings, and in low-temperature operation.

6. **Lithium greases,** of special composition, have the best available low-temperature characteristics and are also excellent for high-temperature uses. However, their temperature characteristics may vary widely, depending on the kind of materials used. Certain lithium greases have the highest known mechanical stability.

In addition to the kind of metal atom in the soap or soaps used, the fat or fatty acids from which the soap is made also influence grease characteristics. It has become known that different fatty acids can have remarkable effects on soap lattice structures. Animal fats such as tallow and lard can be of highly variable composition.

On the other hand, certain vegetable and fish oils are quite constant in composition. These otherwise desirable oils, however, do not make hard, firm soaps. The chemical explanation of this is that the carbon chains in their molecules are unsaturated. By first saturating the molecules of these oils with hydrogen atoms (the process of hydrogenation) solid fats are developed that are uniform in composition. This, in turn, assures a high degree of uniformity in the soaps made from them.

TABLE 1—CHARACTERISTICS AND PROPERTIES OF LUBRICATING GREASES

Specifications—	Older specialized greases			Newer multipurpose greases	
Type of soap—	CALCIUM	SODIUM	ALUMINUM	BARIUM	LITHIUM
Texture	Smooth to buttery	Fibrous or buttery	Smooth to stringy (never fibrous)	Smooth to fibrous	Smooth to buttery
A.S.T.M. dropping point (approx.)	190° F.	325° F. (plus)	185° F.	350° F. (plus)	350° F. (plus)
Service qualities—					
Max. continuous usable temps. (avg.)	160° F.	250° F. (plus)	180° F.	275° F. (plus)	275° F. (plus)
Resistance to water	Good	Fair	Good	Good	Good
Resistance to breakdown and softening by working	Fair to Good	Fair to Excellent	Poor to Fair	Poor to Fair	Good to Excellent
Behavior after subjection to 250° F. and cooled (under working conditions)	Separates	No change	Liquefies	No change	No change
Principal uses	Cup pressure gun, heavy duty (for general purpose industrial use)	Antifriction; plain bearings, flat surfaces (for moderately high temp. lubrication)	Chassis fittings, oscillating bearings, etc. (where insolubility or extreme tackiness is needed)	Multipurpose "all bearings" (for general automotive lubrication)	Aircraft lub. multipurpose (for superior performance at extreme temperature)

Mixed-base greases are included among the older specialized greases. The mixed-base greases are used principally in life-lubricated bearings and as specialized lubes for widely varying and unusual demands. Specific data for mixed-base greases are not given due to variations in the percentages and types of ingredients used and in manufacturing methods.

What's NEW

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Latest News About New Tools, Techniques and Services

Have You Tried All 20 McCullough *PERTISHING* Services?

Pertishing is a composite word meaning perforating, testing and fishing. Don't look it up in the dictionary —you won't find it. It is a new word, coined by McCullough, to help acquaint you with the fact that McCullough has many other services in addition to perforating. Many of these services may be new to you.

Actually, the McCullough Tool Company started out over 25 years ago with drill pipe cutters and casing cutters, later adding other rotary services to the line. In 1934 the hard shooting McCullough Gun Perforators were developed. In 1938 the first electric service truck was put into operation. This permitted electrical firing of the Gun Perforators and the introduction of new electric wire line tools.

Recently many new electronic tools and jet tools have been put into operation. Although these tools have had wide acceptance there are still many in the oil industry who are unfamiliar with their use. Therefore, every month, this page will be devoted to a frank discussion of these new tools, techniques and services. Each month a new tool or tools will be explained in detail. When permitted we will give actual field reports, the result of the use of the specific tool.

New Tools Urgently Needed

As wells are drilled deeper and deeper, rig costs soar, pointing up the need for new tools that can do the job faster. Also, it has been found that many tools that performed satisfactorily in shallow wells, were not made to stand the higher temperatures and much greater pressures encountered in deep wells.

McCullough field engineers keep in constant touch with oil field activities. By working with various oil operators and personnel of the oil companies they learn the need for new tools. From then on the research, experimental and engineering departments translate the need into ideas and the ideas into tools.

A new tool must be tested in various wells in many fields. It must prove its worth under the most extreme conditions. It must meet the standards of the engineer, the drilling contractor, the tool pusher, the superintendent. If it's to replace an old tool, it must do the job better and faster. If it represents a new service, without any set standards by which to compare, it must do the job it was intended for or be discarded. A new tool, then, that has become popular in a short time, has passed all these tests. These are the tools we will discuss each month.

20 SERVICES

The 20 McCullough services, consisting of many new tools and certain other tools that have stood the test of time, can be classified in two groups: Rotary Services and Electric Wire Line Services. Included in the Electric Wire Line Services are:

1. Perforating—Burrless Bullet and Glass Jet. Deepest perforating, hardest shooting by actual test.
2. Bridging Plugs — Drillable, expandable. McCullough and Baker.
3. Magna-Tector—Locates the stuck point of casing, tubing and drill pipe in minutes, within inches.
4. Jet Casing Cutter—World's fastest casing, tubing and drill pipe cutter.
5. Jet Back-off Tool and String Shot—World's fastest way to recover stuck pipe.
6. Jet Bottom Hole Cutter—Fragmentizes lost or stuck fish.
7. Electronic Weight Indicator—Supersensitive, small as a flat iron.
8. Sonic Collar Locator — Locates collars, liner tops, well bottom, etc.
9. Magnetic Fishing Tool — Surface indicates location and recovery of fish.
10. Combination Services—Many of these tools can be used with only one set-up at the well. For an example: the Magna-Tector and Back-Off Tools; the Magna-Tector and Jet Casing Cutter; the Jet Bottom Hole Cutter and Magnetic Fishing Tool; etc.

Included in the McCullough Rotary Services are:

1. Double Acting Rotary Jars and Bumper Subs—To reduce number of fishing jobs.
2. Safety Joints—Releases quickly in emergencies.
3. External Drill Pipe Cutters—For all outside pipe cutting.
4. Mechanical Long Knife Internal Casing Cutters—Cuts all sizes pipe and tubing.
5. Thin Wall External Casing Cutters — For outside cutting in small clearances.
6. Rotary Releasing Overshots — Completely encircles fish.
7. Rotary Releasing Spears — Engages or disengages at will.
8. Gun Tester — Water Shut-off, perforating and testing in a single run. Both burrless bullets and jet.
9. Mechanical Junk Basket—Crushable, finger-type.
10. Portable Rotary Table—Hydraulic. Safe, fast, powerful.

You will find a complete description of these tools in the McCullough section of the Composite Catalog, 1951-52 edition. Copies of the McCullough section may be obtained by writing to the Los Angeles or Houston offices at the addresses listed below.

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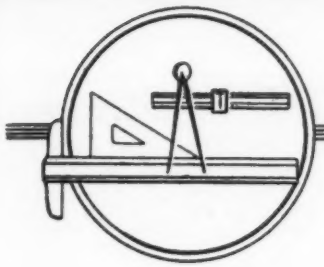

ENGINEERING fundamentals

No. 439

Present Worth of Operational Profit for Constant-Percentage Decline

THE table given below presents a summary of calculations made from Equation 2 presented in last week's installment. This equation sums up the present worth of total profit from an oil-lease operation where the decline rate in per cent per year and the future economic life have been estimated. The table, based on a discount rate of 6 per cent per year, covers decline rates from 5 to 30 per cent per year. The term B, the barrels of future recovery per barrel decline in average daily production, is included in the value shown under decline rate and the life in years is determined from a graph shown in a previous issue. An example of the application of the table follows.

Example.—A lease is producing at an average rate of 40 bbl. of oil per day at an average decline rate of 14 per cent per year. Net realization from oil after royalty and taxes is $2.00 per bbl. and operating expense averages $6,000 per year. What is the present worth of profit from operation discounted at 6 per cent per year compounded annually if it is assumed that the constant-percentage decline, net realization, and expense apply in the future?

Solution.—The economic limit of production or final production rate would be

$$\frac{6{,}000}{365 \times 2.00} = 8.2 \text{ bbl. per day}$$

$$P/P_i = 8.2/40 = 0.205$$

From a chart of a previous issue, the life in years to reach a value of $P/P_i = 0.205$ at a decline rate of 14 per cent per year is determined to be 10.5 years.

From Table 1 the present worth of revenue from 1 bbl. per day of production at $1 per barrel for a decline rate of 14 per cent per year at the end of 10.5 years by interpolation is read as $1,500.

Present worth of reserve = 40 bbl. per day × $2.00 per bbl. × 1,500 = $120,000.

From the left-hand column of Table 1 the present worth of $1.00 per year constant operating expense for 10.5 years by interpolation is read as $7.6236. Present worth of operating expense over the 10.5-year period would be 6,000 × 7.6236 = $45,700.

Present worth of profit = $120,000 — $45,700 = $74,300.

Total profit before discounting would be calculated as follows:

The value of B corresponding to 14 per cent per year decline is read from the chart as 2,400-bbl. per bbl. decline in daily production.

Oil production over 10.5-year period = (40 — 8.2) × 2,400 = 76,500 bbl.

Revenue from oil, 76,500 × $2.00 = $153,000.

Operating expense over 10.5-year period = 10.5 × $6,000 = $63,000.

Total profit, $153,000 — $63,000 = $90,000.

Average discount factor at 6 per cent per year compounded annually = $74,300/$90,000 = 0.826.

For the problem cited a discount rate of 5 per cent per year results in an average discount factor of 0.841 as compared to 0.826 for a discount rate of 6 per cent per year.

Present worth of revenue from 1 bbl. of daily oil production declining in rate of production at a given per cent per year at a net price of ($1/bbl.) and discounted at 6 per cent compounded annually.

Present worth of 1 dollar per year of operating costs, years discounted at 6% compounded annually	Years	Rate of decline, per cent per year															
		5	6	7	8	9	10	12	14	16	18	20	22	24	26	28	30
0.9434	1	336	333	332	329	328	326	324	320	316	311	308	306	302	298	293	289
1.8334	2	638	628	624	616	610	604	592	575	568	551	540	532	519	506	492	481
2.6730	3	909	890	878	863	850	836	817	785	767	738	715	698	672	651	628	607
3.4651	4	1,152	1,122	1,102	1,080	1,040	1,035	1,000	956	925	886	849	820	786	751	718	716
4.2124	5	1,369	1,328	1,296	1,267	1,236	1,203	1,155	1,093	1,050	993	948	910	864	823	735	745
4.9174	6	1,564	1,510	1,472	1,430	1,389	1,348	1,263	1,206	1,147	1,077	1,022	976	922	872	823	780
5.5825	7	1,737	1,672	1,620	1,572	1,520	1,470	1,386	1,296	1,229	1,144	1,080	1,024	962	907	852	810
6.2099	8	1,893	1,810	1,755	1,695	1,634	1,574	1,475	1,372	1,290	1,195	1,122	1,060	992	933	872	820
6.8018	9	2,032	1,933	1,870	1,800	1,730	1,662	1,548	1,431	1,338	1,235	1,154	1,086	1,013	948	885	830
7.3602	10	2,159	2,058	1,974	1,892	1,812	1,735	1,610	1,480	1,379	1,267	1,180	1,106	1,027	959	893	837
7.8870	11	2,268	2,158	2,063	1,972	1,890	1,800	1,658	1,519	1,410	1,290	1,198	1,121	1,038	....	....	....
8.3840	12	2,371	2,246	2,138	2,040	1,944	1,854	1,700	1,551	1,424	1,307	1,211	1,130	1,047	....	....	....
8.8528	13	2,460	2,322	2,207	2,100	1,995	1,900	1,735	1,578	1,454	1,322	1,223	1,140	1,052	....	....	....
9.2951	14	2,540	2,396	2,267	2,150	2,040	1,938	1,764	1,590	1,469	1,331	1,230	1,145	1,056	....	....	....
9.7124	15	2,611	2,452	2,322	2,197	2,080	1,970	1,788	1,617	1,481	1,341	1,236	1,149	1,059	....	....	....
10.1061	16	2,680	2,510	2,368	2,235	2,110	2,000	1,808	1,630	1,491	1,348	....	....	....	....	....	....
10.4775	17	2,735	2,560	2,408	2,270	2,140	2,023	1,825	1,642	1,500	1,353	....	....	....	....	....	....
10.8278	18	2,789	2,600	2,444	2,300	2,162	2,043	1,838	1,651	1,505	1,357	....	....	....	....	....	....
11.1583	19	2,835	2,638	2,476	2,325	2,183	2,058	1,850	1,659	1,510	1,360	....	....	....	....	....	....
11.4701	20	2,877	2,642	2,502	2,348	2,202	2,075	1,860	1,665	1,514	1,363	....	....	....	....	....	....
11.7643	21	2,911	2,700	2,528	2,368	2,217	2,087	1,864	1,670	....	....	....	....	....	....	....	....
12.0418	22	2,948	2,728	2,549	2,385	2,230	2,098	1,872	1,674	....	....	....	....	....	....	....	....
12.3036	23	2,978	2,752	2,567	2,400	2,243	2,108	1,878	1,677	....	....	....	....	....	....	....	....
12.5506	24	3,003	2,772	2,585	2,413	2,252	2,114	1,884	1,680	....	....	....	....	....	....	....	....
12.7836	25	3,030	2,790	2,598	2,423	2,260	2,120	1,886	1,683	....	....	....	....	....	....	....	....
13.0034	26	3,050	2,810	2,610	2,433	2,266	2,123	....	....	....	....	....	....	....	....	....	....
13.2108	27	2,068	2,822	2,622	2,440	2,273	2,129	....	....	....	....	....	....	....	....	....	....
13.4064	28	3,086	2,838	2,633	2,448	2,278	2,132	....	....	....	....	....	....	....	....	....	....
13.5910	29	3,103	2,846	2,640	2,453	2,283	2,135	....	....	....	....	....	....	....	....	....	....
13.7651	30	3,115	2,850	2,647	2,460	2,287	2,139	....	....	....	....	....	....	....	....	....	....

By Rex W. Woods, consulting petroleum engineer, Tulsa

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OIL AND GAS EQUIPMENT Digest

IT'S NEW — CHECK IT

TRADE LITERATURE

1 THE BOOK OF KLINGER JOINTINGS. The physical properties of asbestos, the base material used in Klinger jointings; Klingerit, a universal jointing; Klingerit 1000, a wire-reinforced jointing; Klinger-Oilit, intended for use with oils, solvents, and refrigerants; and Klinger-Acidit, an acid-resisting compressed jointing, are all covered in a 24-page, multicolor booklet. *Richard Klinger, Ltd.*

2 LIFE EXTENSION FOR CONDENSER TUBES. Sections of this handsome, 28-page, multicolor book cover the following subjects: Preventive metallurgy to maintain tube health; protective films arrest corrosion; Revere minute men in condenser-tube war; development work in tube alloys; a photographic study of types of corrosion encountered; quality controls, Revere condensor tubes, composition, and general recommendations; condenser plates and support sheets; estimating data; and additional Revere product. *Revere Copper & Brass, Inc.*

3 TURRET TRUCKS FOR HORIZONTAL MATERIALS HANDLING. In addition to descriptions of the pallet truck, the tug, the platform truck, the auto-loader, and the cargo truck, this eight-page brochure includes illustrations of a number of applications. *Hyster Co.*

4 LARGE INDUCTION MOTORS, a 28-page book covers both squirrel-cage and wound-rotor induction-type motors. Features such as all-metal rotors, split bearings and half brackets, copper-fin construction, and special enclosures are completely described. *Westinghouse Electric Corp.*

5 CLASS VPH OIL ENGINES. Publication 9089 covers 4, 5, and 6-cylinder engines in the 80 to 150-b.hp. class. Full specifications and illustrations are given on each of three models. *Ruston & Hornsby, Ltd.*

6 MIRACLE CHAIN JACK describes the operation of a jack that lifts the bumper and axle at the same time. Fender is lifted much higher than axle, thus accomplishing a two-jack job with one jack. *Colper Sales Co.*

7 COMMERCIAL CHEMICAL DEVELOPMENT is a folder discussing an evaluation service for those who are manufacturing, or can manufacture chemicals. Service covers such questions as what chemicals to produce and in what quantities. *R. S. Aries & Associates.*

8 GILBARCO ROTO-PRIME is a multicolor brochure describing self-priming centrifugal-pumping units. Cutaway illustrations and line drawings, together with data tables outline the principal features of these units. *Gilbert & Barker Manufacturing Co.*

9 SUBMERGIBLE CENTRIFUGAL points the way to more water at less cost. The three-color brochure presents the Series 400 waterwell pumps. An annotated engineer's drawing fully describes construction and operation features. *Reda Pump Co.*

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Apr. 12, 1951

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OIL AND GAS EQUIPMENT Digest IT'S NEW CHECK IT

10 A NEW INDUSTRIAL TEAM. The acquisition and utilization of the entire tractor allied-equipment business of Isaacson Iron Works is announced in this fully illustrated brochure. Particular emphasis is placed on rail facilities and proximity to International Harvester tractor plants. *Road Equipment Division, Pullman-Standard Car Manufacturing Co.*

11 MACHINERY FOR MANY APPLICATIONS. Bulletin 187 outlines factory facilities; presents illustrated histories of machinery in use, and gives a concise description of each piece of equipment illustrated. *Nordberg Manufacturing Co.*

12 DIESEL ENGINE SERIES RPH. Horsepower ratings from 180 to 750-b.hp. are included in this series of engines described in Bulletin AL 350. The 6-cylinder RPH is an in-line engine with cylinders inclined at 30° from vertical, i.e., the V model with one bank of cylinders removed. The 12-cylinder RPH is a V type having two banks of 6 cylinders each, arranged at an included angle of 60°. *Davey, Paxman & Co., Ltd.*

13 EXTRA HARD CATALYSTS. Developed for air-lift type cracking units, two new cracking catalysts are described in this booklet. They are a very hard type, regular TCC catalyst and a very hard SR (sulfur resistant) pelleted catalyst. *Filtrol Corp.*

14 HUDSON AIR-COOLED UNITS. Applications such as jacket water cooling, gas cooling, steam condensing, and hydrocarbon-vapor condensing are illustrated. Actual plant installations are described, and line drawings explain ease of transportation and erection, adaptability, temperatures, partitions, and mechanical assembly. *Hudson Engineering Corp.*

15 LIQUID LEVEL CONTROLLERS. The new issue of Section 103 for Black, Sivalls & Bryson, Inc., Climax Catalog, introduces a new version of the displacement-type liquid-level controller to be known as Types 887, 888, and 889. *Black, Sivalls & Bryson, Inc.*

16 OIL-WELL TUBING. A new 8-page bulletin, No. 378, covering new Spangseal oil-well tubing, illustrated in color, emphasizes design features in relation to solution of tubing-leakage problems and includes specifications for standard sizes. *National Supply Co.*

17 JARECKI VALVE PRICE LIST is a folder containing information on sizes, materials of construction, and prices of the Jarecki line of valves. Included are bronze valves and cocks, iron valves and cocks, iron and brass unions, and expansion and swing joints. *H. K. Porter Co., Inc.*

18 REFINERY PRODUCTS is a catalog containing engineering data on oil, gasoline, liquefied petroleum gas, water, steam, and air hose used in refinery operations. It also gives data on various types of packing materials and expansion joints. *United States Rubber Co.*

19 LIFTRUK. A new bulletin, No. 77, describes and illustrates a line of improved heavy-duty fork-lift trucks in 5 to 10-ton capacity. Engineering features and specification tables are included. *Silent Hoist & Crane Co.*

20 COPPER BASE ALLOYS. Two comprehensive brochures describing cast steels and copper-base alloys. This metallurgical information covers basic problems of metal soundness, porosity, welding, graphitization, creep strength, new alloys, code, and conformance. *Lunkenheimer Co.*

21 AC-ME TESTING INSTRUMENTS is a 32-page bulletin listing both R. S. and Ac-Me testing instruments for the petroleum industry. It describes recording gravitometers with or without controller, deadweight gages, gas-gravity balances, high-pressure consistometers, manometers, etc. *Refinery Supply Co.*

22 CENTRIFUGAL MULTISTAGE COMPRESSORS is an extensively illustrated catalog which gives descriptions and complete engineering data on a line of high-capacity compressors. *Clark Bros. Co., Inc.*

23 FLUIDYNE PUMPS. Bulletin B-2300 describes and illustrates two types of horizontal end-suction centrifugal Fluidyne pumps for general-duty service. Type PE is a close-coupled electric motor-driven pump, and Type PB is a bracket-mounted pump for driving through a flexible coupling, or V-belt or flat-belt pulley. *Peerless Pump Division.*

FOR MORE INFORMATION . . . . use one of these cards

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Corresponding to new equipment items or trade literature abstracts in the Oil and Gas Equipment Digest of The Oil and Gas Journal, Apr. 12, 1951

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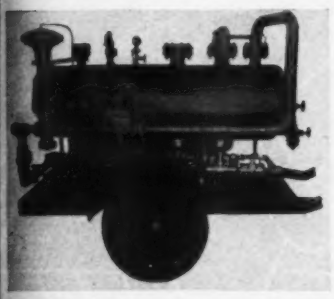
OIL AND GAS EQUIPMENT Digest

IT'S NEW CHECK IT

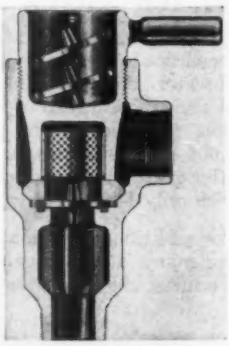
by Dan B. Miller

24 600 PSI. W. P. WELL-TESTING UNIT is a compact portable well-testing unit with 6-ft. 24-in. o.d., and 600-psi. w. p. horizontal oil and gas separator, with oil meter and pilot-loaded oil dump valve. Welded gas run is equipped with facilities for metering gas and has diaphragm-type gas back-pressure valve for maintaining constant pressure on the unit. Oil and gas outlet tie in line is furnished on the unit to permit rejoining the oil and gas after metering. Wellchecker has facilities for addition of, and can be supplied with automatic free-water knockout on unit, which removes and meters free water produced. Also available with skid mounting. Simplifies periodic well test, gas-oil-ratio tests, drill-stem tests, potential tests, etc. *Rolo Manufacturing Co.*



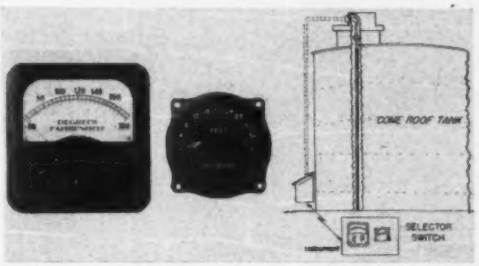
IT'S NEW CHECK IT

25 SAFETY AUTOMATIC PRESSURE RELEASE VALVE is effective, easily installed, and inexpensively maintained. It is manufactured in two models; the 2-in. nominal, for use on well-drilling rigs and pumping units of all types, and the geophysical for use on mud pumps as employed on shot-hole and shallow core rigs. The releasing member is a plastic disk that disintegrates as soon as the maximum desired pressure is exceeded, causing an immediate pressure drop. The disintegration takes place inside the valve so that there is no danger to workmen. The nominal valve can be supplied for pressure up to 5,000 lb. The geophysical model is available for pressures up to 1,000 lb. *Grant Oil Tool Co.*



IT'S NEW CHECK IT

26 NEW RESISTANCE THERMOMETER, designed primarily for determining the average temperature



of petroleum, chemicals, and other liquids in land storage tanks, is accurate and simple to operate. It can be installed for use in existing tanks simply, quickly, and economically without taking the tank out of service. Accurate average temperature readings to within ½° F. are made possible regardless of the product, the product level, and temperature gradient of the product in the tank, and regardless of weather and other conditions. The meter can be located at either the top of the tank, or at the bottom, for more convenient readings. Special installation permits placing the meter in a central control house, if desired, and the thermometers for a number of tanks can be connected to meters in one station. *Weston Electrical Instrument Corp.*

IT'S NEW CHECK IT

27 PRO-TEK-TO PIPE COATING is especially economical to use because it is a cold application coating that requires no heating, no special mixing or preparation. It can be applied by paint brush or by the most advanced pipe-coating machinery. Can be used with or without the various conventional wrappings, is equally effective in atmospheres that are highly corrosive, either indoors or out, eliminates the danger in hot applications of accidental burning, is impervious to severe temperature change, and retains its mastic properties through its long service life. It is made from heavy, first-quality

IT'S NEW CHECK IT

The Oil and Gas Equipment Digest presents a review of what is new in equipment and trade literature . . . makes it possible for readers to obtain full information on every subject by use of convenient "Check It—Mail It" service card. This periodic feature of The Oil and Gas Journal will include all that is new in equipment . . . at a time when new products are being introduced, and existing products improved.

Keep Informed. Save Time. Tear Out Card. Check It. Mail It.

DOWELL CHANNELING ACID is designed to open longer drainage channels—tap production far back from the well bore

Dowell Channeling Acid has been developed to permit acidizing of areas in pay formations far back from the well bore . . . reaching oil production that otherwise might be left untapped. Channeling Acid contains chemical agents designed to form a film on the face of the pay, temporarily blocking all but a few pores. Thus the bulk of the acid used during the treatment can be diverted into the few unblocked pores . . . forming long drainage channels that extend deep into the formation. The film-forming agent in the acid is temporary in action and breaks down to a free-flowing liquid in a few hours.

This recent product of Dowell research provides a new method of improving the producing characteristics of oil and gas wells. A new well completed in the McClosky formation was producing 2 barrels of oil and 10 barrels of water per day. A Channeling Acid treatment consisted of a small spearhead of regular acid to open up the formation, followed by 750 gallons of Channeling Acid and 2,000 gallons of regular acid. Three and a half months after treatment, production was 50 barrels of oil per day with only 1 barrel of water.

For additional information about Channeling Acid and the many other valuable Dowell oil field services and products, call the nearest Dowell office or station.

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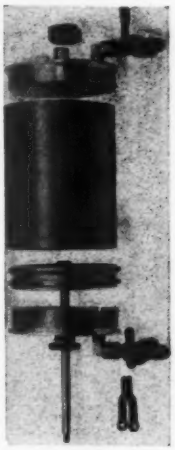
FOR OIL INDUSTRY CHEMICAL SERVICE

Gilsonite asphalt and long, thoroughly matted asbestos fibers. It is to be used wherever severe corrosion damage has been encountered either on underground or above ground installations. *The Warren Refining & Chemical Co.*

IT'S NEW CHECK IT

28 HART VACUUM CONTROL. This mechanism is a simplified load equalizer for compounded gas or gasoline engines. This unit is adaptable to oil-field installations, industrial power plants, and other multiple-engine drives. A vacuum-differential set up by carburetor suction vacuum on both sides of a double-acting piston positions a piston rod connected to the throttle valve of each engine. When the vacuum throttle controls have been properly adjusted, the load between two or more compounded engines will be equalized. Each control is interconnected, and the entire system is tied into the carburetor intake manifold of the lead engine. It will equalize the load of as many as four compounded 350-hp. engines. *Empire Machinery Co., Ltd.*

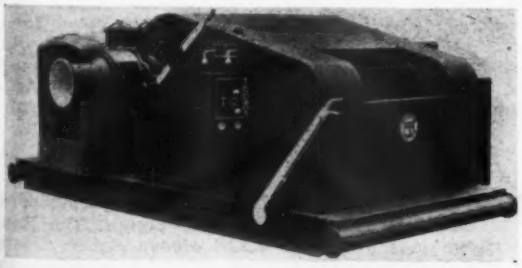


IT'S NEW CHECK IT

29 GRUVAGRIP FITTINGS covers a complete new line of malleable fittings for grooved pipe, including L's, T's, adapter nipples, crosses, laterals, bull plugs, and reducers. Fittings come in sizes ¾ to 12-in., are light, easy to handle, and easy to install. Inside walls of fittings are true circles, smooth and gently curved to prevent turbulence and frictional losses. Wear is distributed evenly over the entire inner wall because it is free of ridges and pockets. They can be removed from the line without disturbing the rest of the piping system and are 100 per cent reclaimable. *Gustin-Bacon Manufacturing Co.*

IT'S NEW CHECK IT

30 IDEAL TYPE T-12 DRILLING RIG. The new rig, designed for 120 input horsepower, will normally be considered for drilling in the 1,500 to 3,000-ft. depth range and for servicing and workover jobs in the 3,000 to 6,000-ft. range. The T-12 rig is readily adaptable to trailer or truck mounting. The engine-mounted hydraulic torque converter drive is augmented by two draw-works speed ratios to the drum and rotary table.



This high and low-speed selection, combined with torque-converter characteristics provides an efficient utilization of engine power for all drilling requirements. Air controls are provided for Fawick Airflex clutch on the main drum, sand reel drum, and rotary drive, and for the engine throttle, inertia brake, and breakout cathead. The hoisting drum, 12¾ in. in diameter and 36 in. long, is a free-spooling type mounted on roller bearings. Over-all height is 51¼ in. Width without catheads is within 8 ft. Skid is 14 ft. long. *The National Supply Co.*

IT'S NEW CHECK IT

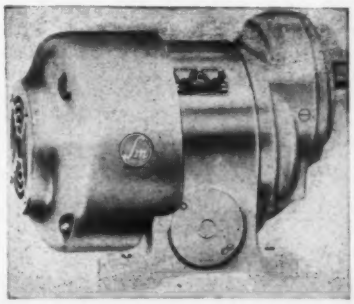
31 SPECIAL PURPOSE, THIN WALL EXTERNAL CUTTER. The new cutter permits external recovery of drill pipe, casing, and tubing in tight holes. It is for use only where standard cutters cannot be used, due to extremely small clearances between the pipe and casing, or between joints and the wall of the drilled hole. All operating parts of the cutting mechanism, including the knives, are contained in the wall of the cutter. No parts protrude inwardly or outwardly while going into the hole. Since conditions are never standard, these cutters are made only on special order. *McCullough Tool Co.*

IT'S NEW CHECK IT

32 HYDRAULIC PROTECTOR INSTALLATION UNIT. Using the hydraulic installation unit, the PB drill-pipe protector may be installed on the transfer sleeve in a matter of seconds. Several transfer sleeves may be kept loaded with protectors and ready for immediate installation on the drill pipe. The hydraulic installation unit is designed with a gasoline engine and pump as a power source. The PB unit is also available to utilize any other source of hydraulic pressure at the rig. *Patterson-Ballagh.*

IT'S NEW CHECK IT

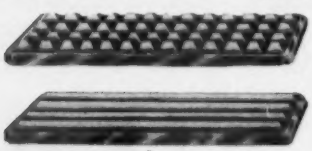
33 SLO-SPEED GEARED MOTORS. This new type geared motor is of the single reduction, Klosd-Tite construction for atmospheres containing nonexplosive dusts, vapors, and injurious foreign materials. An external fan forces powerful cooling blasts of air over the case. Output shaft ratings are the six A. G. M. A. speeds starting at 780 r.p.m. down to and including 280 r.p.m. This new motor, type FWFA, is totally enclosed and includes such outstanding features as labyrinth



seals, liberal heavy-duty ball bearings lubricated for life, and the patented herringbone rotor. Can be mounted in any position without modification. *Sterling Electric Motors.*

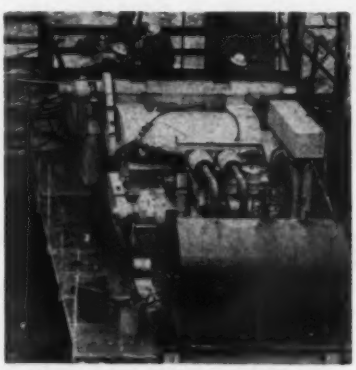
IT'S NEW CHECK IT

34 NO CHIP TONG DIES are made to exacting standards from uniform high-quality steel, and are available in standard lengths for both 1 and 1¼-in. die slots. Chipproof ends eliminate all danger of flying bits of metal from the die while being driven into the slot, thus preventing accidents and injuries. Dies are reversible for longer wear and more convenient installation. *Drilling Equipment Manufacturing Co.*



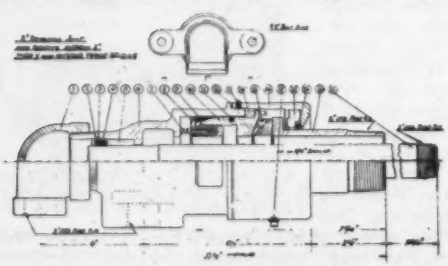
IT'S NEW CHECK IT

35 NEW HEAVY-DUTY WELL-SERVICING HOIST is intended for well pulling and workover service on wells ranging up to 15,000 ft. in depth. The hoist is of the double-drum type, with extra sandline capacity and although it is skid-mounted, it is intended to be used interchangeably on a special semitrailer with a duplicate unit. The semitrailer will have attached a Hopper-designed folding mast to permit the servicing of wells without derricks. A General Motors Twin Six diesel torque-converter unit Model 12107 is used as a prime mover making available approximately 300 hp. at the converter output shaft. Instead of the conventional jack shaft and selective clutch arrangement an Allison "Torqmatic" transmission is used to provide the required high, low, and reserve ratios. *Hopper Machine Works, Inc.*



IT'S NEW CHECK IT

36 NEW REVOLVING JOINT with a rotating feed or siphon pipe can be used extensively in the petroleum industry. Where it is necessary to feed and return through the same end of the rotating member under pressure. This joint is capable of high-speed rotation and is very low in turning torque. Rotation takes place on a flat face carbon disk while the opposite side of the carbon ring has a ball seat to compensate for all eccentricity. The carbon ring has a tendency to compress rather than break apart. Joints are manufactured in all sizes from ½ to 5-in. *Rotherm Engineering Co., Inc.*



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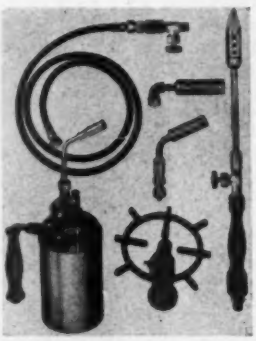
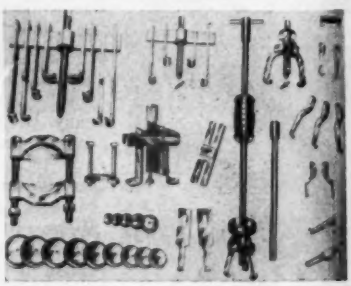


37 NEW ALL-PURPOSE PORTABLE L.P.-GAS TORCH. It is compact, light, easy to handle and economical. Has a heatproof, natural-grip handle, and base is weighted to stand firmly. Capacity is 0.91 lb. propane, easily refillable. Operates continuously for nearly 4½ hours. Besides the standard tip with pointed, concentrated flame for fine work, soldering, and lead burning, the assembly kit provides a tip for every type of work. Tip 491-S has a blast-type high-speed flame, excellent for field use. The 491 gives a broad flame, for sweating of copper joints, wiping joints, and preheating. *Mutual Liquid Gas Equipment Co., Inc.*

IT'S NEW CHECK IT

38 PROTO MASTER PULLER SET. No. 4000AB was designed for all types of vehicle, equipment, and plant maintenance. It includes 6 basic pullers; heavy, medium, light, wheel, slide-hammer, and bearing-separator types; and 28 supplementary parts. Hundreds of setups can be made from the set, because puller parts are interchangeable, eliminating the need for, and cost of, many special pullers. *Plomb Tool Co.*

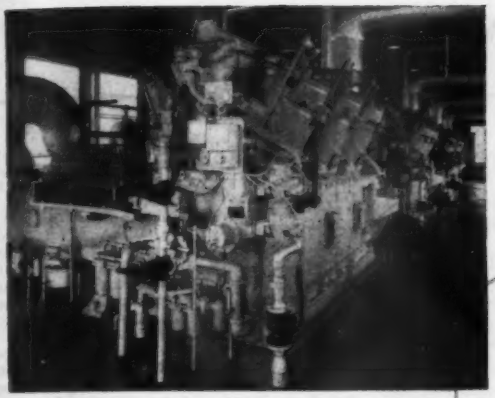


IT'S NEW CHECK IT

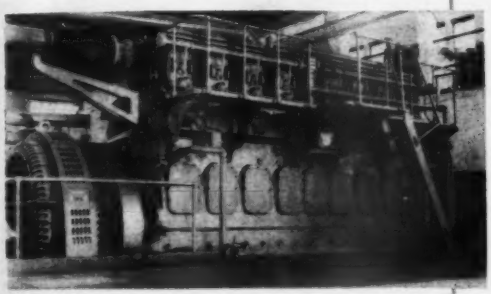
39 ECONOTOWER COOLING UNIT is a compact water-cooling tower designed for efficient economical operation. As the performance of these units is fairly standard in application, engineers have designed and are producing the Econotower on a mass-production scale. The Econotower is built in three distinctly different types: (1) horizontal flow, (2) vertical flow, (3) cylindrical vertical flow. Towers are completely prefabricated, and ready for rapid erection. *Santa Fe Tank & Tower Co.*

IT'S NEW CHECK IT

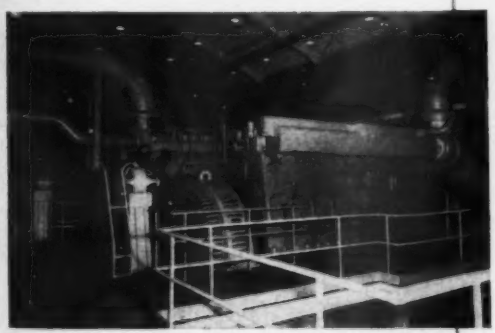
40 EQUISEAL STUFFING BOX has been developed to eliminate leakage on process pumps. The Equiseal sleeve is a radically vaned sleeve which rotates with the shaft to create a pressure which equalizes the suction pressure. Atmospheric pressure exists on the pressure side of the stuffing box as well as outside to eliminate leakage. The new seal has been designed for use on all Allis-Chalmers process pumps with suction heads up to 15 ft. at 1,750 r.p.m. or 6 ft. at 1,150 r.p.m. *Allis-Chalmers.*



Four 330 hp, 400 rpm, Cooper-Bessemer compressors, equipped with Ross lube oil coolers, in a Louisiana refinery compressor station.

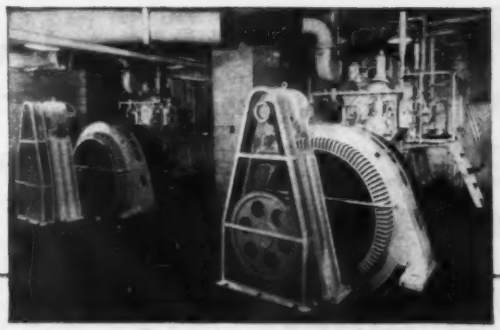


950 hp, 300 rpm, Cooper-Bessemer gas engine, equipped with Ross lube oil cooler, direct-driving generator in a Texas municipal power plant.



1650 hp, 327 rpm, Cooper-Bessemer gas-diesel turboflow engine, equipped with Ross lube oil and jacket water coolers, in an Arizona municipal power plant. Larger Cooper-Bessemer engine in background, also Ross equipped.

Compressor building of a New Mexico natural gas company, housing five, 1100 hp, 300 rpm, Cooper-Bessemer turboflow gas engine compressors, each equipped with Ross lube oil coolers.



Two 485 hp, 400 rpm, Cooper-Bessemer gas-diesel engines, equipped with Ross lube oil coolers, direct-driving generators in a Texas gas company plant.

Peak efficiency, long life and low maintenance of Cooper-Bessemer engines

demand exchangers of same qualities

Rugged, work-wise Cooper-Bessemer engines and compressors are widely known for their peak efficiency, long life and low maintenance. And, Cooper-Bessemer is able to successfully maintain such a reputation *only* by demanding of its components the same rigid standards for engineering and manufacture that it insists upon in its own plant.

The consistent use of Ross lube oil and jacket water coolers is an example of this. Cooper-Bessemer, like other famous makers of Diesels and gas engines, has long relied upon Ross Exchangers to carry the burden of temperature protection . . . a responsibility carried out with eminent success.

For engines of *any* rating, Ross fully standardized exchangers have unsurpassed advantages. Literature is available with full details. Write.

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REFINING

No TEL Shortage Foreseen

NEW YORK.—Misgivings of refiners in regard to a shortage of tetraethyl lead were allayed somewhat last week when E. L. Shea, president of Ethyl Corp., told customer oil companies that no shortage exists now or will occur in the foreseeable future at Ethyl Corp. plants.

Shea said the company's plants in Baton Rouge and those under construction near Houston are completely integrated and include manufacturing facilities for metallic sodium, chlorine, ethyl chloride, and ethylene dichloride. Supplies of ethylene dibromide are made at the sea-water plant of Ethyl-Dow Co. near Freeport, Tex. Capacities for producing these intermediate chemicals are adequate to allow maximum production schedules for TEL and finished antiknock compounds at each plant site, Shea said.

Contracts with outside suppliers for metallic lead, salt brine, ethylene gas, and electricity are adequate to cover company needs. There is every reason to believe that these suppliers will meet their commitments, he said.

The Baton Rouge plants are now setting production records, and March was the biggest month in the company's manufacturing history. Shea said that this production rate is expected to continue throughout the year.

Platformer Near Completion

GRANDFIELD, Okla.—Bell Oil & Gas Co.'s new Platforming unit under construction at the company's refinery here is expected to be placed in operation about the middle of May. The unit will have a processing capacity of 1,500 bbl. per day.

Construction has been under the direction of Dr. I. A. Anderson, Bell's vice president of refining. Grandfield refinery has a crude-oil-charge capacity of 7,000 bbl. per day, and a thermal cracking capacity of 3,750 bbl. per day. Its polymer-production capacity is 90 bbl. daily.

W.P.C. Refining Papers

Advances in utilization of oil products will be discussed at the Third World Petroleum Congress at The Hague, the Netherlands, May 28-June 6. Included in the list are the following papers (all papers will be distributed in preprint form at the sessions):

"Progress Toward More Efficient Automobile Engines," T. A. Boyd, U.S.A.; "Aircraft Turbine Engine Fuel Requirements," E. A. Droegemueller, U.S.A.; "Problems of Hydrocarbon Combustion," W. Jost, Germany; "Limiting Factors in Manufacture of Lubricating Grease," S. J. M. Auld, H. M. Davies, and E. G. Ellis, U.K.

"Advances in the Utilization of Tetraethyl Lead," J. B. Macauley, U.S.A.; "Antiknock Agents and Fuel Additives," G. Roberti and E. Pipparelli, Italy; "Developments in the Field of Soda Base Greases," A. Bondi and others, U.S.A.; "Specificity of Pour Point Depressants in Lubricating Oils," R. A. Ruehrwein, U.S.A.

"The Mechanism of Boundary Lubrication," F. P. Bowden, U.K.; "Detergents for Motor Oils," C. M. Loane, L. W. Mixon, and F. S. Wood, U.S.A.; "Engine Lubricating Oils for the Reduction of Wear," F. A. Buck and others, U.S.A.; "Sulfur in Automotive Gasoline," E. J. Gay, U.S.A.; "Utilsation de Bitume pour l'Agglomeration des Fines de Charbon," R. Brossard and F. Chapuis, France; "Stability and Compatibility of Fuel Oils," C. W. G. Martin, U.K.; "Lubrication Problems," G. Vogelpohl, Germany.

Refining Dividends Drop

WASHINGTON.—Publicly reported cash-dividend payments of oil-refining corporations amounted to only $4,400,000 in January and $14,200,000 in February compared with $19,800,000 and $15,500,000, respectively, in the same months last year, according to figures compiled by the Department of Commerce.

The department explained, however, that the very low dividend payments in January as compared with a year ago shoul be interpreted in the light of two unusual circumstances: That December 1950 was a particularly heavy payment month, with many special and extra dividend disbursements, and a number of companies shifted payments customarily made in January back to December.

PAD Cites Sulfur Shortage

SAN ANTONIO. — The increasing shortage of sulfur has again been brought to the attention of refiners by the Petroleum Administration for Defense.

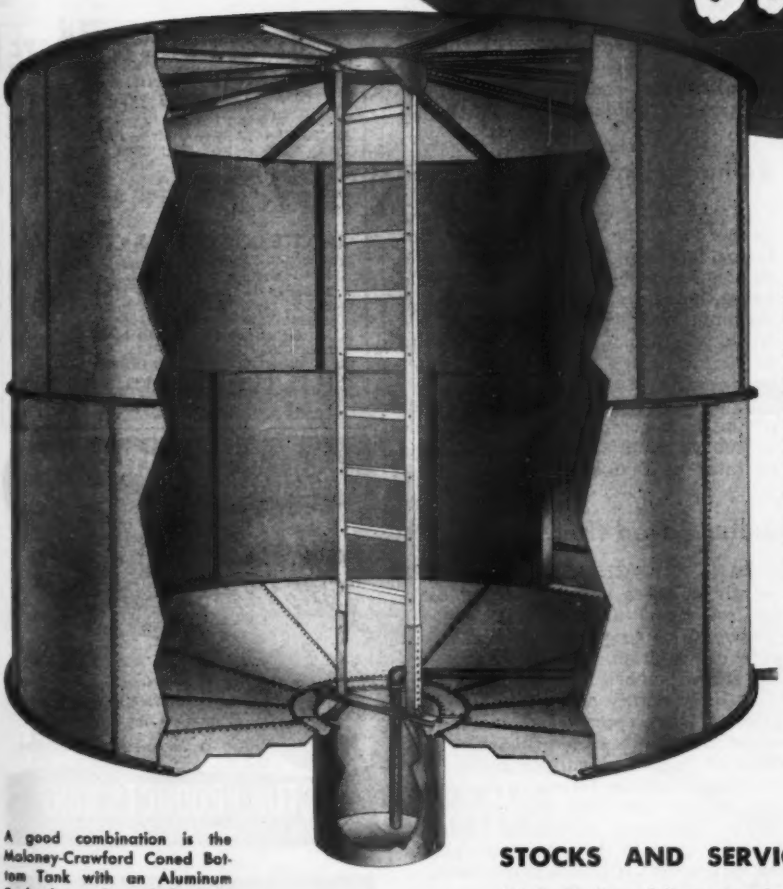
Speaking before the Western Petroleum Refiners Association at its annual meeting here last week, Reid Brazell, director of the refining division of PAD, said that sulfur is among the tightest of basic chemical materials and is presenting an ever-increasing problem.

The sulfur shortage has resulted in a related shortage of sulfuric acid upon which PAD is now gathering information from refiners on end use, preparatory to issuing some form of curtailment on the use of acid by the industry, Brazell said.

Brazell suggested that individual refiners study the possibilities of recovering sulfur from refinery and field gases to augment over-all supply. The small refiner in most cases could not economically install facili-

XUM

HOW A MALONEY-CRAWFORD CONED BOTTOM WILL HELP COMBAT Tank Corrosion



A good combination is the Maloney-Crawford Coned Bottom Tank with an Aluminum Deck, for such a deck materially reduces the corrosion effects of hydrogen sulphide gas in solution with crude oil.

Maloney-Crawford originated the CONED BOTTOM TANK with sump tank as an aid in combatting corrosion caused by water and galvanic action in the bottom and lower ring of a bolted tank.

The tank bottom has a drop of 1" to 12" horizontal run, permitting the complete drawoff periodically of all water and BS from the tank bottom thru a drain connection as shown in the illustration to the left.

The sump tank is 35¼" in diameter fabricated from 3/16" steel. Depths of 12" and 3'-0" are available. The inside ladder is supported by a heavy channel member laid across the top of the sump tank.

The sump tank is removable without taking up the bottom or dismantling the tank. The bottom, apron and sump tank joints all overlap towards the sump tank to prevent pockets for water collection and subsequent local corrosion.

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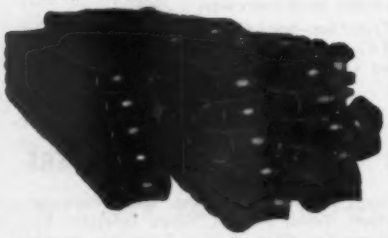

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ties for conversion of hydrogen sulfide to sulfur. However, if the small refiner is located near a larger plant, some attempt should be made to see whether hydrogen sulfide could be processed by the larger plants, he said.

Plant Exceeds Capacity

LAKE CHARLES, La.—Cit-Con Oil Corp.'s lube-oil plant here, which is rated with a design capacity for 5,600 bbl. daily of finished products, is currently producing at a rate exceeding 6,800 bbl. per day. Cit-Con, owned 65 per cent by Cities Service Co. and 35 per cent by Continental Oil Co., produced a total of 2,041,000 bbl. of lubricating-oil base stocks during 1950, an average of 5,591 bbl. per day. The year's production of fully refined wax was 70,817,000 lb., an average daily output of 194,000 lb.

Refinery Expansion Proposed

LONG BEACH.—Eureka Refining Corp., formerly known as Ben Hur Corp., has announced that it is preparing to start a modernization and expansion program at its 4,700-bbl. skimming plant here. Purpose of the work will be to increase production of higher-octane gasoline and other products.

J. A. Novelli continues as president of the new company. Other officials of the company are much the same as those of Ben Hur.

Sulfur Saved from Smog

SAN FRANCISCO.—Sulfuric acid worth $6,700 is being produced daily in refineries around Los Angeles from sulfur recovered in the smog-control program, the State Division of Mines reported here last week.

In the monthly bulletin of the division it was reported the refineries' smog program is recovering about 160 tons of hydrogen sulfide daily. The hydrogen sulfide, formerly representing a loss into the atmosphere of about 320 tons of sulfur dioxide, largely is sold to chemical plants which convert it into sulfuric acid.

The 415 tons of acid produced daily has a value of over $6,700 at the current minimum market price the report said, adding that "since the sulfuric acid is in short supply this recovery of otherwise wasted material is of significance."

Refining Briefs

Ethyl Corp. has announced that it is carrying out an experimental program to determine the value of amyl nitrate for improving cetane number of diesel fuels. There are no plans at present for commercial sale of the additive, and any future plans depend on results of further tests.

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Send for complete catalog and prices. State kind of service, pressure, temperature, pipe size and indicate style at left, threaded, flanged or weld ends.

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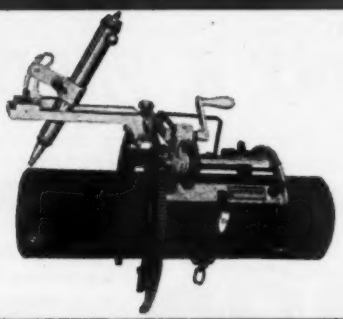

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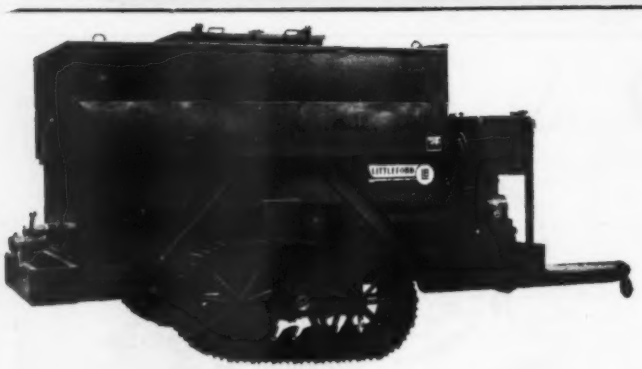

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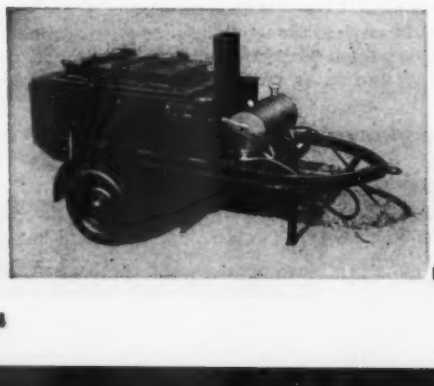

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PIPE LINES

Outlet for San Ardo

LOS ANGELES.—A construction contract in excess of $2,000,000 was awarded Bechtel Corp. last week by General Petroleum Corp. for the salvaging of its 38-year-old, 8-in. Mojave pipe line and for the line's reinstallation at San Ardo in Monterey County, California.

In announcing the contract, George Supple, General's vice president and director of pipe lines, explained the new San Ardo line will for the first time provide an economical means of transporting the heavy and highly viscous crude produced there. Discovered in 1947, the field has been shut in most of the time since then because the sticky crude was impossible to move by ordinary pipe-line methods.

General Petroleum will use a small line to carry light petroleum products from a marine terminal at Estero Bay to San Ardo field. When the "flow ability" or fluidity of the crude has been improved through blending with these light fractions, and the combined streams heated to 170° F., it will be pumped through the paralleling reconditioned 8-in. line to the terminal.

Under the new contract, Bechtel will take up the old 43-mile Mojave line, clean and prepare it for welding at a reconditioning plant in Ventura, and then relay it. It is anticipated that 98 per cent of the pipe, enough for the new 40-mile line, will be reused. The relaid line is to be in operation about June 1.

Field Outlets Under Way

DALLAS.—Tex Harvey Pipe Line Co., jointly owned by Tex Harvey Oil Co. and Ashland Oil & Refining Co., will build approximately 56 miles of 12, 8, and 6-in. pipe lines in Midland, Glasscock, and Upton counties, Texas, giving additional outlet to the rapidly expanding Spraberry sand fields.

The new lines will supplement the present carrier from Tex Harvey field to Basin Pipe Line System's tank farm in eastern Midland County. That line was said to be moving approximately 6,500 bbl. of oil a day, with a peak capacity of 15,000 bbl. daily. Completion of the new line will boost the daily capacity to 50,000 bbl.

Surveys of rights-of-way are being made and pipe for the new projects have been secured. Construction will start immediately.

The new 12-in. line will be laid from Basin System's station in Midland County to Tex Harvey field, paralleling the present line. From that point an 8-in. line will go to the eastern extension of the field in Glasscock County. Either an 8 or 6-in. line will be laid from Tex Harvey field to Germania field, 8 miles north.

El Paso Gas Line Held Up

WASHINGTON. — The department of interior has notified El Paso Natural Gas Co. that right-of-way through public lands for the last 16 miles of the company's 400-mile San Juan pipe line in northern Arizona will not be granted unless El Paso meets certain conditions.

The company must agree to operate the line as a common carrier for gas produced both from public lands and elsewhere. El Paso has agreed to operate as a common carrier, but the department says that the company's rate schedule filed with the Federal Power Commission does not reflect common-carrier status. Rates on the schedule are higher for transportation of gas not owned by El Paso, the department said.

The new stipulation requires the company to assess rates on other firms' gas with a more reasonable relationship to rates for its own.

P.I.E.A. Program Readied

DALLAS.—New trends and equipment in electronics as applied to the petroleum industry will be discussed in group sessions, round-table symposiums, and in technical papers at the twenty-third annual conference of the Petroleum Industry Electrical Association and the Petroleum Electric Supply Association to be held here April 17-19.

P. I. E. A. members most of whom are representatives from major pipeline companies in charge of communications, will hear speakers discuss developments in microwave-relay systems, remote-controlled switching devices, modern carrier current channeling, and generation of electricity by engine-driven units.

An added feature of the meeting this year will be a round-table discussion of cathode-protection applications to underground and aboveground structures.

Pipe Line Briefs

Sinclair Pipe Line Co. has announced the formation of an electrical-engineering department with Glenn L. Ladd as chief electrical engineer. The new department, headquarters at Independence, Kans., will handle all electrical engineering, installations, and maintenance, plus external corrosion and electrolysis problems.

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Three Firms to Run 1951 Williams Brothers Projects

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J. H. WILLIAMS

Williams Brothers Co. officers are: John H. Williams, president; David R. Williams, Jr., Kenneth A. Owen, and Robert L. Buck, vice presidents; Charles P. Williams, vice president and treasurer; and E. G. Thiel, secretary.

This firm has headquarters in the National Bank of Tulsa Building, Tulsa. The Chamblee, Ga., branch is managed by H. W. Franks; the Louisville, Ky., branch is under C. E. Cooper.

Present projects.—The 707-mile, 14-18-in. project for Plantation Pipe Line Co. is being built by Williams Brothers Co., under supervision of David R. Williams, Jr., project manager, and George Allen, general superintendent, with headquarters at Tuscaloosa, Ala. Also at Tuscaloosa is the field office for O. L. Martin, superintendent of one of the spreads. The other spread is operating from Talledega, Ala., under T. E. Davis. Later on, spreads on the Plantation project will be increased to four or five.

C. P. WILLIAMS

D. R. WILLIAMS, JR.

Within recent weeks the firm completed 26 miles of 16-in. for Citizens Gas and Coke Co., Indianapolis. Last year it built the Siburua water line

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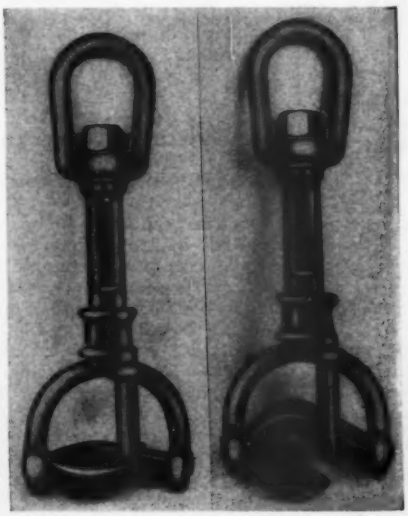

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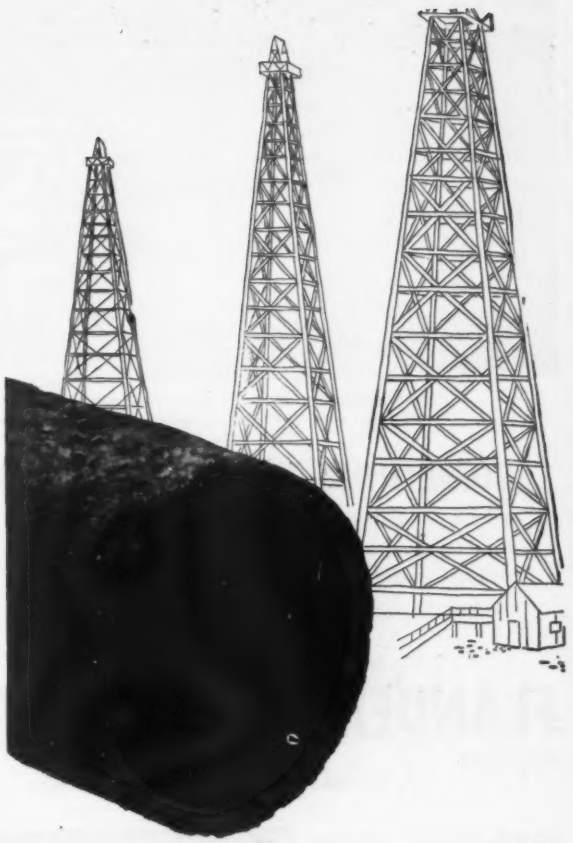

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Cream	Olive Oil
Chocolate	Paints
Caustics	Paint Oils
Chemicals	Petroleum
Coal Tar	Pitch
Creosote	Plastics
Dishwater	Printing Inks
Drugs	Road Oils
Dyes	Soap Liquors
Ether	Starch
Fuel Oils	Sizing Liquids
Food Products	Soy Bean Oil
Gasoline	Syrups
Glycerin	Tar
Glue	Tomato Juice
Glucose	Turpentine
Grape Juice	Varnish
Hot Oils	Vegetable Oils
Juices	Viscose
Kerosene	Water
Lacquer	Wine
Lard	Yeast

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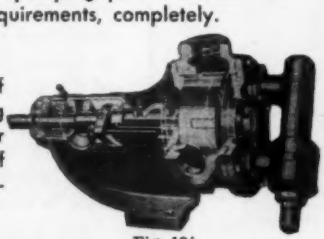

Fig. 124

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See Our Catalog In SWEETS

Viking PUMP COMPANY Cedar Falls, Iowa

from Falcon to refineries on the Paraguana Peninsula of Venezuela.

Venezuelan firm.—Williams Brothers de Venezuela, S. A., carries on operations only in Venezuela. These are directed by Charles P. Williams, administrator and general manager. Headquarters office is at Edificio Phelps, Caracas.

Marvin E. Jones, general superintendent for the firm, is currently supervising the overland construction of Shell Caribbean Petroleum Co.'s 165-mile, 30-in. crude-oil line from Palmarejo to Cardon and Las Piedras.

R. L. BUCK

K. A. OWEN

B. E. Barnes is manager of the work which is scheduled to start north from El Placer, near Las Mercedes, on the 195-mile, 10-12-16-in., natural-gas line for Venezuela Atlantic Transmission Corp. to extend to Caracas, La Guaira, Maracay and Valencia.

Williams Brothers Corp. — Williams Brothers Corp., with the same officers as Williams Brothers Co., operates in other parts of South America.

This year the three Williams Brothers companies are expected to put seven main-line spreads in the field, in addition to river-crossing gangs and gangs for city work.

Superintendents, in addition to Allen, Martin, Davis, and Jones, include Clyde Gregory and A. T. Maxwell.

Pennsylvania Line Proposed

WASHINGTON.—Construction of a natural-gas line extending 172 miles from gas-producing fields in Clinton County, Pennsylvania, to the Pittsburgh area has been proposed by Manufacturers Light & Heat Co., of Pittsburgh, in an application of the Federal Power Commission.

The proposed project would cost about $9,613,000. The line, built of 16, 20, and 24-in. pipe, would extend from a point in Gallagher Township in Clinton County to a point northwest of Cannonsburg in Washington County.

The company estimates that theoretical maximum capacity would be about 105,000,000 cu. ft. per day. Gas thus supplied would decrease the estimated 1951-52 deficiency within Columbia Gas System where all gas is treated as a pooled supply, as well as provide more gas for the Pittsburgh area, the company said.

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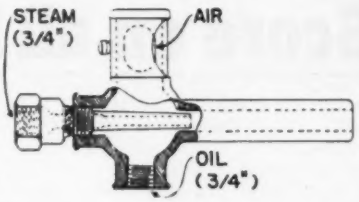
The INFERNO Oil Burner

This burner is really a boiler fuel carburetor, mixing air directly with the fuel and steam, which results in less steam being used to atomize a given amount of oil, and a hotter fire, which increases boiler capacity. The rush of live steam or compressed air through the burner creates a vacuum in the large central chamber. This vacuum draws in the primary air from the atmosphere on one side and oil from the other. Air and oil unite with a swirling motion and are shot from the burner perfectly vaporized.



GOOD DESIGN FEATURES — The simplicity of the INFERNO Oil Burner is the outstanding feature of its construction. The only parts used are the Body, Steam Nozzle, and Air Spring Valve.

ANY GRAVITY FUEL AT ANY PRESSURE — The only gravity requirement of the fuel is that it be fluid enough to pass through the delivery pipe to the ¾" pipe connection of the burner. The only pressure requirement is that it be high enough to get the oil to the burner.

WILL NOT CLOG — Anything that will pass through the ¾" pipe inlet of the burner will pass on through the burner.

ECONOMICAL — The burner is economical because it completely burns all the fuel that passes through it, making a perfectly clear fire.

MAKES PERFECT FIRE — The burner makes a perfectly clear intense heat without smoke. Ignition takes place close to the end of the burner.

MORE HORSE POWER — By maintaining a hotter fire with the INFERNO Oil Burner, it is possible to secure 10% to 20% more horse power from the same boiler.

INFERNO products are sold direct or through leading supply stores. For complete information on the Oil Burner, write for free copy of Bulletin 13-B.

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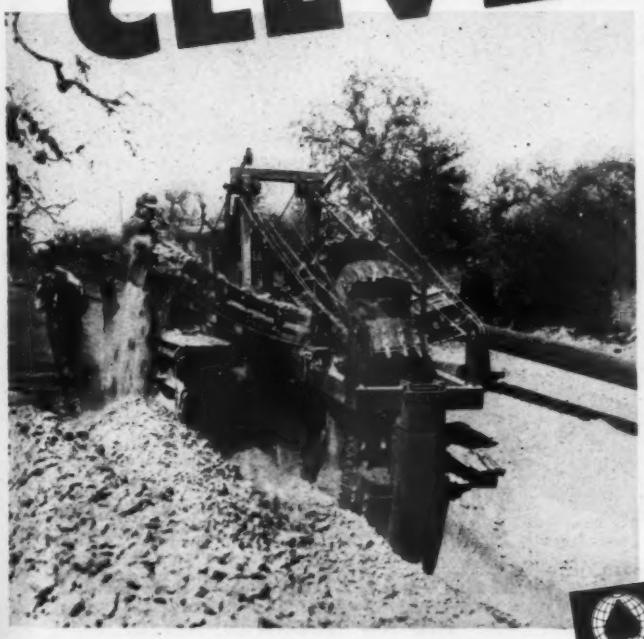

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2

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3

CHAPMAN STEEL VALVES are designed to equal or surpass — A.S.A. and A.P.I. Standards in all pressures and temperature ranges.

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MANUFACTURING COMPANY
INDIAN ORCHARD, MASS.

NATURAL GAS

A.G.A. Meeting

Gas' economy in defense program to be stressed

DALLAS.—"Economy of Natural Gas in National-Defense Mobilization" will be the central theme of the 1951 spring meeting of the natural-gas department of the American Gas Association to be held here on May 7-8.

Bruce K. Brown, deputy administrator of Petroleum Administration for Defense, will deliver the principal address. D. A. Hulcy, president of A.G.A. and of Lone Star Gas Co., will speak on behalf of all segments of the gas industry.

More than 1,000 delegates are expected at the meeting at the Baker Hotel. Charles E. Bennett, chairman of the natural-gas department and vice president of A.G.A., will preside.

Addresses.—An interim report on the research program of the gas industry will be presented by Elmer F. Schmidt, chairman of the A.G.A. technical and research committee and program chairman for the spring meeting.

Other speakers will include Paul Kayser, president of El Paso Natural Gas Co. Frank Lerch, president of Consolidated Natural Gas Co.; Olin Culberson, chairman of the Texas Railroad Commission; and John E. Goble, president of National Tube Co.; J. F. Eichelmann, El Paso Natural Gas Co.; J. S. Quill, General Electric Co.; J. S. Bailey, Continental Oil Co.; Arthur W. Emerson, U. S. Soil Conservation Service; H. A. Rhodes, superintendent of communications for Transcontinental Gas Pipe Line Corp.; and A. A. Cullman, Columbia Engineering Corp.

Construction film.—James S. Moulton, vice president of Pacific Gas & Electric Co., will present a color-sound movie showing construction of the 500-mile, 34-in. natural-gas-transmission line from Topock, Ariz., to Miltipas, Calif., on San Francisco Bay.

Following the 2-day meeting, the executive board representing the combined natural-gas and manufactured-gas departments of A.G.A. will meet May 9 at the Adolphus Hotel.

Storage Project Progresses

DEPEW, Okla.—Oklahoma Natural Gas Co.'s underground-storage project here will be in full operation by August 1, W. R. Kubista, chief engineer of the firm, announced last week. The project, designed for a maximum daily deliverability of 200,000 M.c.f. per day, will be the third and largest gas-storage project operated by the Oklahoma Natural system.

Capacity will be 48 billion cubic feet. It will supply an estimated 15 per cent of the company's total heating-season load. During the summer months, residue gas from the West Edmond field gasoline plants and other central Oklahoma areas will be stored at Depew, which is the eastern terminus of a 26-in. gas-transmission line from Edmond station.

Four 1,100-hp. compressors are now being installed at Depew. A dehydration plant, designed to process 200,000 M.c.f. per day, will be constructed this year. Gas will be dehydrated and compressed to a maximum injection pressure of 1,480 psi., the original maximum pressure. This spring four additional service wells will be drilled bringing the total of service wells to eight.

The Depew project is an abandoned gas field lying 4½ miles south of Depew. Originally, it covered about 1,900 acres overlying a closed anticline in the Dutcher (Pennsylvanian) sand series found at an average depth of 3,250 ft.

Originally, there were 26 gas wells drilled and abandoned in the field since its discovery in 1922. In addition, there were six gas wells remaining in the field when Oklahoma Natural took over the project. Since gas injection started at Depew in May 1950, 8,285,000 M.c.f. has been injected and 375,000 M.c.f. withdrawn to March 1, 1951.

The new project will bring the company's total storage capacity to 58 billion cubic feet, the remaining 10 billion is stored in the Haskell and Osage (near Tulsa) projects.

System Expansion Planned

NEW YORK.—Consolidated Natural Gas Co. will spend more than $66,000,000 this year on construction to meet anticipated demands for natural gas.

About $15,600,000 will be allotted to expand the company's underground-storage system at Oakford, South Bend, and Sabinville, all in Pennsylvania. The huge Oakford project, a joint operation with Texas Eastern Transmission Corp., will eventually be capable of delivering 400,000,000 cu. ft. of gas per day.

The program also includes the outlay of $10,000,000 for extending the company's pipe-line system to serve the Utica-Albany area in New York, and another $10,000,000 for additional transmission lines from the underground-storage fields to the Pittsburgh-Youngstown-Cleveland area.

Consolidated's planned 1951 expenditures are almost double the 1950 outlay of $33,000,000 for construction.

Construction Program Set

CLEVELAND.—East Ohio Gas Co. has announced plans to spend $16,000,000 this year on construction of a new 26-in. gas-transmission line, added production, underground-storage facilities, and extensions and enlargements of existing lines.

The new line, estimated to cost about $6,200,000, will parallel the company's 20-in. line completed last fall. It will extend from Petersburg, Ohio, to the eastern suburbs of Cleveland, and will supply natural gas to several other cities, including Pittsburgh. Combined deliverability of the two lines when construction is completed will be about 400,000,000 cu. ft. of gas per day.

Gas Facilities Approved

WASHINGTON.—Equitable Gas Co., of Pittsburgh, has received authorization from the Federal Power Commission to construct natural-gas facilities in Washington County, Pennsylvania, estimated to cost about $1,055,739.

The project will include a new compressor station with three gas-engine-driven 1,100-hp. compressor units, connecting pipe lines, a glycol-dehydration plant, gas scrubbers, and auxiliary equipment.

The new station will replace an existing installation and will compress gas into Equitable's Finleyville, Tepe, and Bunola underground-storage pools. The company estimates that the new station will mean that 13 billion cubic feet of gas can be stored in Bunola storage pool by the fall of 1954, and deliverability of its over-all system will be increased to about 80,000,000 cu. ft. daily.

Storage Facilities O.K.'d

WASHINGTON.—Texas Gas Transmission Co. has received the necessary authorization from the Federal Power Commission to construct natural-gas facilities needed to connect and operate Alford underground-storage field near Petersburg, Ind.

Facilities will cost $938,811, and will include 12 miles of connecting line, a 1,200-hp. compressor station, a storage-gas-measuring station, and 4½ miles of storage field lines.

The company plans to use the field to meet increased demands on its system. Utilization of the field and construction of related facilities will make available from storage a capacity of 30,000,000 cu. ft. per day.

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- All 10 of the staves work as a unit, providing a centering strength many times greater than the conventional Centralizer.
- Casing may be rotated without rotation of the Centralizer.
- It provides a greater peripheral bearing on the wall of the hole. The staves are staggered to give 10 points of contact.
- The original "Tailor-Made" to hole size Centralizer. No on-the-job adjustments necessary.

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Among the Drilling Contractors

Program Complete for Drilling Safety Clinic

An impressive array of discussions have been lined up for the program, now completed, for the sixth annual drilling-industry safety clinic of the American Association of Oilwell Drilling Contractors to be conducted at the Baker Hotel, Dallas, May 3 and 4. The program, listing subjects of scheduled discussions and special speakers, follows:

May 3—Morning Session

Address of Welcome, A. W. Thompson, Thompson-Carr, Inc., Houston, association president; Safety Committee's Work Program for 1951, H. W. Davidson, Davidson Drilling Co., Odessa, Tex., chairman of the association's safety committee; How Drilling Contractor's Accident Experience Affects His Insurance Costs, W. C. Morris, Allen & Morris, San Antonio; Securing Employe Cooperation in Safety, Fred Bayless, Big Chief Drilling Co., Odessa, Tex.; Training Supervision in Accident Prevention, Tom D. Hughston, safety supervisor, Texas Power & Light Co., Dallas.

May 3—Afternoon Session

Safety in Handling Drill Pipe, open discussion; Safety in Well Pulling, colored motion picture produced by the California Production Service Co., Long Beach; The Contractor's, the Drilling Superintendent's, and the Toolpusher's Responsibility in Making a Safety Program Work, Russell Fitzpatrick, Highway Underwriters, Inc., Austin, Tex.; Safety Versus Making Hole, toolpushers' forum led by W. W. Duncan, safety director, Loffland Brothers Co., Tulsa.

May 4—Morning Session

Reducing Slipping Hazards on Rig Floors, C. G. Starr, safety supervisor, Phillips Petroleum Co., Oklahoma City; Practices for Reducing Rig Noise, Roy E. Dishman, safety director, Hunt Oil Co., Shreveport; Methods for Heating Rigs, J. L. Muir, safety director, General Petroleums of Canada, Ltd., Calgary, Alta.; Use of Visual Aid in Training Drilling Crews, H. H. Hillman, California Production Service Co., Long Beach; Contractor Liability As It Relates to Crews Going to and from Work, Marion B. Church, general counsel, A.A.O.D.C., Dallas; Barge and Off-Shore Safety Drilling Problems, Allen L. Garner, Gulf Refining Co., Houston; New Developments in Drilling Equipment and Personal Protective Equipment for Reducing Hazards, discussion by manufacturers and exhibitors.

May 4—Afternoon Session

Safjo (The Safe Game), H. B. Ziegler, safety director, Halliburton Oilwell Cementing Co., Duncan, Okla.; Mechanical Hazards Existing in Certain Items of Drilling Equipment, E. Dale Mount, Harry Bass Drilling Co., Dallas; How the Contractor and Operator Can Cooperate in Drilling Wells Safer, open discussion led by Sam King, safety director, Kerr-McGee Oil Industries, Inc., Oklahoma City.

Presiding at the respective sessions will be H. W. Davidson, Davidson Drilling Co., Odessa, Tex.; G. W. Hutcheson, George P. Livermore, Inc., Lubbock, Tex.; John S. Jackson, Southern Production Co., Baton Rouge, La.; Robert Dalgleish, Big Chief Drilling Co., Oklahoma City.

Southern Six Drilling Co., Baton Rouge, La., is drilling for Atlantic Refining Co. at a wildcat location a mile north of production in the North Woodlawn field, Jefferson Davis Parish, Louisiana Gulf Coast. The test, 1 Walker, in 9-9s-6w, is projected to 11,200 ft.

Watts in West Texas

Ed Watts Drilling Co., Overton, Tex., has acquired a site at San Angelo, in western Texas, where it will establish a maintenance shop for the company's drilling equipment and trucks to be operated in that area. The company previously operated only in East Texas and on the Gulf Coast. It now has one rig running in West Texas.

Drilling Firm Organizes

Yarbrough, Zoch & Flato Drilling Corp. is a newly organized drilling contracting firm with headquarters in the Wilson building, Corpus Christi, Tex. Associates in the firm are: R. W. Yarbrough, formerly with Baldridge King, McAllen, Tex.; Frank Zoch, independent operator, Corpus Christi; and Fred Flato, Corpus Christi businessman.

Tiger Drilling Co., Oklahoma City, has a rig working just south of the Kansas line in northern Grant County, Oklahoma, where it has a contract with Bay Petroleum Corp. and Josaline Production Co. for a Wilcox sand test. Objective is expected around 5,000 ft. The test is at 1 Hoover, in the C NE NW 14-29n-3w. The contracting company is an affiliate of Josaline Production Co., one of the operators.

Althen Drilling Co., Calgary, Alta., has the rotary contract for a projected 6,000-ft. Madison lime test which Spring Coulee Petroleum Corp., Ltd., is starting as a northwest extension development on the Spring Coulee-Del Bonita trend in southern Alberta Province, Canada. The location is just north of the Montana line.

Camay Drilling Co., Los Angeles, has a 5,000-ft. test under way in the Oxnard-Point Hueneme area, near Oxnard, Ventura County, California. It is being drilled for Oceanic Oil Co. on the latter's Petit lease in 22-1n-22w.

Circle Drilling Co., Lake Charles, La., has the drilling contract for a wildcat test which T. G. Markley is starting at 1 Bowman-Hicks, C SE SW 32-2s-2w, Evangeline Parish, Lou-

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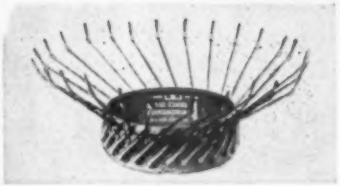

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isiana Gulf Coast. Location is about 4 miles south of Pawnee. Contract is for 12,000 ft.

Barbour Drilling Co., Tulsa, is keeping a rig running for Gulf Oil Corp. in the Fox-Graham pool, Carter County, Oklahoma. Latest contract is for 10 Garrett, NE NW SW 27-2s-3w.

George P. Livermore, Inc., Lubbock, Tex., is drilling for Wilshire Oil Co. at its 23-129 McElroy, northwest offset to Sinclair Oil & Gas Co.'s Ellenburger discovery well in Upton County, West Texas. Contract is for 5,000 ft., at which depth Wilshire will move in one of its own rigs to complete the well.

Hondo Drilling Co. has a rig running for Skelly Oil Co. in the recently opened Aspermont South field in Stonewall County, Texas. Current operation is 1-B Dalby, Section 53, Block D, H&TC Survey, a north offset to the discovery well.

Lohman & Johnson, Evansville, Ind., have the contract for a well, 1 Funk-Stewart-Blair, which Graham-Messman-Rinehart Oil Co. of Wichita, Kans., will drill in the Baskett-Spottsville area, 10 miles northeast of Henderson, Henderson County, western Kentucky. Location is in the SW NW NW 18-Q-25. The well is the first for the Kansas company in the Illinois Basin region.

Fleet Drilling Co., Ada, Okla., has contracted for a projected 7,300-ft. test which W. A. Delaney, Jr., also of Ada, will drill in the East Oconee area, 12 miles west of Coalgate, Coal County, Oklahoma. The location, in the SE NE SW 29-1n-9e, is about 2 miles west of gas-distillate production recently developed in the area.

Brinkerhoff Drilling Co., Casper, Wyo., is moving a rig to a location northwest of production of the South Glenrock field in Converse County, Wyoming, where it will drill for Walter Davis at 1 Gooder-Finlon, SE NE NW 7-33n-75w.

ROTARY RIGS IN OPERATION*

(United States and Western Canada)

Area—	Week ended 4-2-51	Change week ended 3-26-51	Change week ended 4-3-50
Gulf Coast	524	— 1	+ 27
W. Tex.-N. M.	802	—23	+ 70
Ark.-N. La.-E. Tex.	140	— 9	+ 21
Oklahoma	293	— 8	+ 45
Kansas-S. Nebraska	151	— 2	+ 30
Illinois	75	+31	— 19
Rocky Mountains	108	0	+ 43
Pacific	140	0	+ 8
Total U. S.	2,233	—18	+225
Western Canada	99	— 1	+ 29
Total	2,322	—19	+254

*Courtesy Hughes Tool Co. Trends in drilling activity in the United States as a whole and the Gulf Coast and Arkansas-North Louisiana-East Texas areas are shown by charts on pages 150 and 151.

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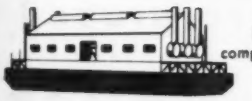
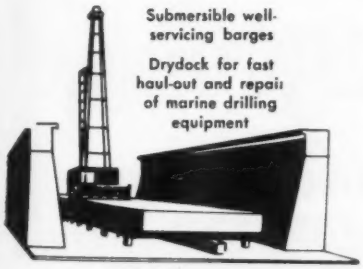


Boiler and compressor barges

Water, oil, and supply barges



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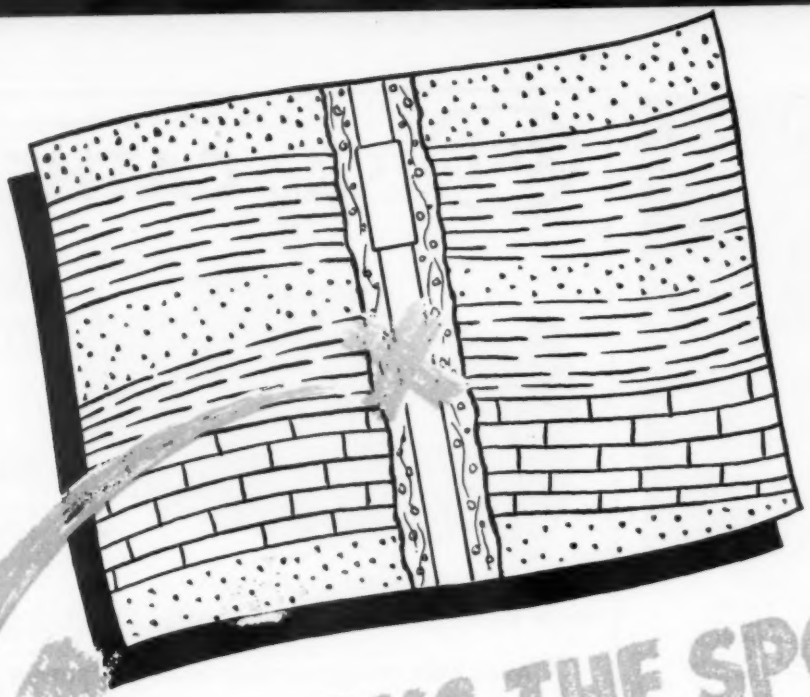

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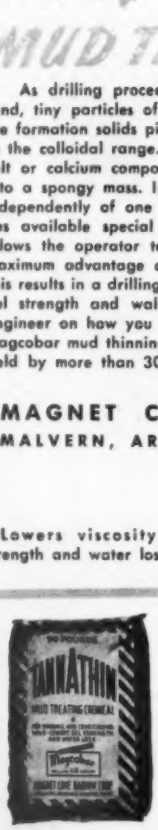	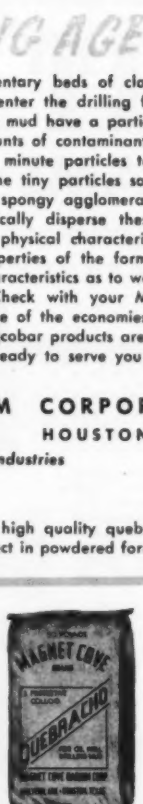	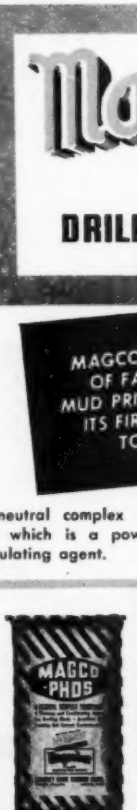	

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REPORTS ON

Exploration and Drilling

North Dakota's First Oil Well

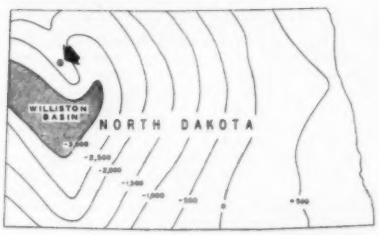
THE long-awaited discovery of oil in North Dakota has been made. Drilled on a seismograph-located crest of a broad, low-dipping anticline whose surface expression was mapped by a U. S. Geological Survey field party in 1917, Amerada Petroleum Corp. 1 Iverson, 6-115n-95w, Williams County, has flowed oil at various rates up to 44 bbl. per hour through ¾-in. choke. The oil is 53°-55° gravity and is accompanied by gas flowing at a rate of over 5 million cubic feet daily. The producing interval is at 11,630-60 ft. in a limestone believed to be of Devonian age which was treated with 4,000 gal. of acid.

It was the third production test in Amerada's well that added North Dakota to the list of oil-producing states. After drilling to a depth of 11,744 ft. and cementing casing on bottom, the 1 Iverson tested the interval 11,706-20 ft. and recovered 3 gal. of mud and water-cut, 45°-gravity oil before swabbing dry. The second test at 11,676-11,706 ft. yielded a small flow of sour gas.

The commercial value of Amerada's deep strike cannot be definitely determined until some production history on the discovery well and follow-up wells in the immediate area has been established. However, the well has already indicated sufficient potentialities to have made its place in the oil industry's history and its effects have already been expressed in accelerated interest and activity in the expectant Williston basin area.

As brought out on this page in the January 25 issue, Amerada's wildcat is so far from any definitely established stratigraphic section that the stratigraphic depth of any point in the last 1,000 ft. or so of hole is questionable. It is possible that the well has dug stratigraphically deeper than any other well in North Dakota, including the F. F. Kelly and Plymouth Oil Co. 1 Fritz Leutz, 90 miles to the southeast, which was drilled to a subsea depth of 10,242 ft.

Amerada's well was dug to a subsea depth of 9,354 ft., about 1,000 ft. deeper from the sea-level horizon than The California Co. 1 Kamp, 6 miles south and west; and has been running about 100-200 ft. higher than the 1 Kamp since topping the Mississippian-Big Snowy group at —4,620 ft.



Back in 1938 when The California Co. well was drilled, stratigraphic correlations were carried north from the Black Hills area and they are not altogether consistent with the currently used nomenclature carried east from Montana. This switch of ideas makes the correlation of published sections extremely confusing.

The Nesson anticline (see accompanying map which shows the generalized structural picture of North Dakota by contours on top of the Cretaceous-Dakota group) was first drilled in 1926 by Big Viking Oil Co. about 6 miles south and west of Amerada's well. Big Viking's well, which logged gas at 4,300 ft., was drilled to 4,700 ft. California 1 Kamp, just a few hundred yards northeast of the Big Viking well, was completed dry nearly 13 years ago without finding more than an odor of oil in cores cut in the lower part of the hole which was bottomed at a depth of 10,281 ft.

Running northwestward into Montana from the southwest corner of North Dakota is the Baker-Glendive structure, an asymmetrical anticline that extends in a nearly straight line for a distance of over 100 miles. On this anticline, which forms the western limit of the Williston basin, is Cedar Creek gas field producing from Upper Cretaceous beds. There has been a little oil produced from older rocks (probably Mississippian-Madison) on this anticline. This oil production and that recently discovered in Manitoba *(see this page in the February 8 issue)*, which is still wobbling between a commercial producer and a dry hole, offer the best proven indicators that the Paleozoic oil found by Amerada is not restricted to the deep portion of the Williston basin but is more likely to be found throughout the area.

Philip C. Ingalls.

HIGHLIGHTS OF WEEK'S DEVELOPMENTS

ROCKY MOUNTAIN REGION.—General Petroleum Corp. struck high-gravity oil at its Tip Top 4X12G, Green River Basin wildcat in Sublette County, Wyoming. The well flowed at an estimated rate of 2,400 bbl. per day on a drill-stem test of the Nugget sand between 9,688-9,728 ft., total depth. Operator plans to drill deeper to determine the full depth of the producing zone.

WEST TEXAS.—Kewanee's new oil well north of Salt Creek field in Kent County has spurred drilling, and opened the possibility of a new and separate structure. The 1 Oliver was drilling ahead at 6,636 ft., projected to the water level, following a test from 6,522-78 ft. Recovery was 10 ft. of free oil and heavily oil-cut mud. At 6,636 ft., the test was 256 ft. into the reef, and below the water table in the field.

SOUTHWEST TEXAS.—Buda lime production has been opened in Wilson County at H. J. Mosser et al. 1 Clarabel DeWees Remschel, Manuel Barrera Grant, Abstract 4. On potential gage, the well flowed 560 bbl. of 30°-gravity oil daily through ¼-in. choke, from perforations at 7,715-7,805 ft.

MID-CONTINENT.—Pennsylvanian lime production seems assured at a McClain County, Oklahoma, wildcat. Atlantic Refining Co.'s 1 Newbern, 22-5n-2e, tested 42°-gravity oil at 4,273-4,300 ft. In Kansas, Pyramid Drilling Co. 1 Schumaker, 26-12s-22w, Trego County exploratory well, logged good oil shows in the Arbuckle on two tests.

XUM

Oklahoma

McClain County Wildcat Flows Oil During Tests

A PROMISING oil discovery appears to have been made by Atlantic Refining Co. in the Byars area of McClain County where the company's 1 Newbern, SE SE NW 22-5n-2e, flowed clean oil in a drill-stem test of a Pennsylvanian lime zone at 4,273-4,300 ft. Drilling ahead with the Bromide sand as its objective, the well also had slight shows in Hunton lime, topped at 4,376 ft.

Oil flow in the Pennsylvanian lime zone test was at an estimated rate of 6 bbl. per hour, starting within 14 minutes after the tester was opened. The tester, open 60 minutes, had gas at the surface in 3 minutes. Flow pressure was 650 psi. Recovery in the pipe breakdown was 450 ft. of free oil and 300 ft. of oil and gas-cut mud. Gravity of the oil was 42°.

The location is about 1½ miles northwest of the Byars townsite and about 2 miles west of the one-well Johnsonville pool, opened in 1948 and producing from Viola lime.

Opening of a new pool in northern Kay County has been established by production tests by Dean Witter at his 1 Widener, SE NW NW 20-29n-3e. From 4 ft. of open hole in Bartlesville sand at a total depth of 3,222 ft. the well has been flowing from 6 to 7 bbl. of oil per hour through small chokes. Flowing pressure is 100 psi. Top of the sand is 3,214 ft. with casing run to 3,218 ft. Location is 6 miles northeast of Newkirk, near the abandoned Gray-Noret pool, and just south of the Kansas line.

Gene Goff 1 Bailey, SE SE NE 20-4n-1w, which extends production and opens a new pay zone for the West Pauls Valley pool, Garvin County, swabbed and flowed 57 bbl. of oil in 2 hours and 50 minutes, and then flowed 87½ bbl. of oil in 4½ hours through ½-in. choke. The well has insufficient gas pressure to flow continuously and will be put on the pump. Production is from a detrital zone just above the Bromide pay section from which present wells in the pool are producing. Casing is perforated at 4,649-67 ft. Hole was drilled to 5,001 ft. in the Bromide but missed the pool's pay zone. Casing was run to 4,720 ft.

Another drill-stem test, taking in additional prospective pay zone, has been made by Carter Oil Co. in its 1 Garrett, SE SE SE 32-11n-25w, north of Mayfield, in northwestern Beckham County. Latest test was with bottom of the hole at 10,369 ft. and yielded 390 ft. of 40.5° oil and 90 ft. of gas-cut mud. Tester was open 12 hours. Gas showed in 165 minutes. When the well was closed, bottom-hole pressure built up to 4,800 psi. in 30 minutes. Hole, cased to 10,297 ft., is being cored ahead.

The slender, elongated line of production of the South Ceres pool, Noble County, has been extended another ½ mile to the northeast where Woodrow & Marshall 1 Hall, SW NW NE 32-24n-1e, flowed 91 bbl. of oil through 12/64-in. choke on a 24-hour gage. Production is from the Bartlesville-Burbank sand, open at 4,362-99 ft.

Zephyr Petroleum Co. and Alpha Petroleum Corp. are extending the new Northwest Tyron pool, Lincoln County, ½ mile to the north at their 1 Gray, SE SE NW 36-16n-3e. The well has casing run to the top of the Red Fork sand at 4,130 ft., in which sand drill-stem tests gave evidence of good production. A test, taking in the top 10 ft. of pay yielded 2,300 ft. of oil. A second test with hole deepened to 4,151 ft., flowed gas estimated at 500,000 cu. ft. per day and oil estimated at more than 10 bbl. per hour.

OKLAHOMA SUCCESSFUL WILDCATS

Comanche County: Tide Water et al 1 Tah-Wat-Is-Tah-Ker-Na-Ker, SE SE SW 3-4n-11w, flowed 20 bbl. of 28°-gravity oil per day from Simpson sand at 1,567-75 ft., TD 1,581 ft., elev. 1,239 ft.

Garvin County: Pray et al 2 Townsite, C SW SE 10-4n-4w, flowed 83 bbl. of 43°-gravity oil per day from Osborne sand at 7,950-8,030 ft., TD 8,098 ft., Hart 7,800 ft., elev. 985 ft.

Lincoln County: C. R. Colpitt 1 Payton, SE SE NW 27-17n-3e, flowed 105 bbl. of 41°-gravity oil per day from lower Skinner at 3,987-98 ft., TD; Avant 2,240 ft., Hogshooter 2,960 ft., Layton 3,025 ft., Check-

(Continued on page 154)

Kansas

Arbuckle Shows Oil In Trego County Wildcat

DISCOVERY of a new pool in northeastern Trego County is indicated where Pyramid Drilling Co. logged good oil showings and saturation in Arbuckle lime at its 1 Schumaker, SE SW SE 26-12-22. The location, 1 mile south of Ogallah, is 6 miles west of the Northwest Ellis pool, present nearest production.

Total depth of rotary hole is 3,990 ft. with top of the Arbuckle at 3,961 ft. (—1,646 ft.). Casing has been run to 3,966 ft. for producion tests. Two drill-stem tests were made. The first, taking in the upper portion of the zone at 3,963-72 ft., yielded only 93 ft. of slightly oil-cut mud. However, the second, with hole deepened to its present depth, filled 1,155 ft. of clean oil with tester open only 30 minutes.

In Barton County, Anschutz Drilling Co. is making a Lansing-Kansas City lime well at its Reidl, C EL 10-17-14, a wildcat located 1½ miles northeast of the Carroll pool. Plugged back from the Arbuckle lime, where it tested some oil along with considerable water, the well swabbed 37 bbl. of oil per hour from the upper zone, treated with 1,000 gal. of acid. The Lansing-Kansas City zone, topped at 3,212 ft. (—1,227 ft.), was opened with casing perforations at 3,280-85 ft. Plug-back depth is 3,312 ft.

Another Barton County wildcat, Lewis Drilling Co. 1 Kramp, SE SE SW 6-19-11, located a mile northeast of the Cheyenne pool and about the same distance northwest of the Hammeke pool, is showing promise of production in the Arbuckle. The well produced at the rate of 2 bbl. of oil per hour in swabbing tests before acidizing. Total depth is 3,392 ft. with top of the pay at 3,386 ft. (—1,578 ft.).

Production of the Bryant pool, northern Stafford County, is being extended ½ mile southeast at Armer Drilling Co. 1 Anderson, NW NW SW 2-21-12. The well swabbed 25 bbl .of oil per hour while testing Arbuckle lime, topped at 3,460 ft. (—1,601 ft.) and drilled to 3,466 ft.

KANSAS SUCCESSFUL WILDCATS

Rooks County: Heathman 1 Bassett, SW SW SE 20-10s-20w, pumped 124 bbl. of oil per day from Arbuckle at 3,749-67 ft., TD 3,768 ft., anhydrite 1,646 ft., Heebner 3,421 ft., Lansing-Kansas City 3,462 ft., Simpson 3,732 ft., elev. 2,162 ft.

Stafford County: Deardorf Oil Corp. 1-A Spangenberg, SE SW NE 29-22s-11w, pumped and flowed 185 bbl. of oil per day from Lansing-Kansas City at 3,264-72 ft. and 3,290-3,300 ft., TD 3,613 ft., Sooy 3,558 ft., Simpson shale 3,571 ft., Simpson sand 3,596 ft., Arbuckle 3,603 ft., elev. 1,822 ft.

KANSAS WILDCAT FAILURES

Barton County: Brunson and N. C. R. A. 1 Thill, SW SW SW 5-16s-11w, dry, TD 3,310 ft., anhydrite 672 ft., Heebner 2,864 ft., Toronto 2,881 ft., Douglas 2,891 ft., lime 2,954 ft., Lansing-Kansas City 2,972 ft., Sooy 3,269 ft., elev. 1,799 ft.

Aylward 1 Schneweiss, SW SW NE 30-17s-11w, dry, TD 3,393 ft., Heebner 2,946 ft., lime 3,053 ft., Lansing-Kansas City 3,068 ft., cherty Sooy 3,320 ft., Arbuckle 3,366 ft., elev. 1,835 ft.

Kantor 1 Rubart, NW NW SW 24-20s-13w, dry, TD 3,580 ft., anhydrite 720 ft.,

(Continued on page 154)

California

South Cuyama Field's Hibberd Zone Extended

LOS ANGELES.—A ⅜-mile east extension to the southeastern end of South Cuyama field, Santa Barbara County, seems assured. The extensioner, Richfield Oil Corp. 35-5 Cox, was in the process of being completed after indicating, on a 2-hour flow test, that it would make about a 500-bbl. producer of 36°-gravity crude.

Drilled to 5,988 ft. and plugged back to 5,900 ft., the formation test was in the Hibberd sand at 5,873-5,900 ft. Located in 5-9n-26w, the 35 Cox is about 1 mile southeast of the Hibberd zone discovery well. The latter was completed last November, flowing at the rate of 977 bbl. daily from 4,170-4,260 ft. The 35 Cox, three locations east of regular Homan sand production, thus found the zone some 1,500 ft. lower.

Another Cuyama Valley development was the staking by Richfield of its fourth attempt to open production on the DeKoch ranch, about 5 miles west of Russell Ranch field. The new wildcat, A-4 De Koch, was staked in 24-11n-29w. In 14-11n-28w, about midway between the Russell Ranch and Morales Canyon fields, R. B. Watkins abandoned the 1 Luce at 4,540 ft. It reportedly was abandoned in the Cretaceous after topping the Painted Rocks at 1,950 ft. and the lower Dibblee at 3,460 ft.

In the San Joaquin Valley region, the area between Mountain View and Edison fields continued to receive new developments. On the southwest edge of Edison production, in 28-30s-29e, California Exploration Co. 28-2 Porter opened a new fault-block pool. About 1 mile to the southeast, Independent Exploration Co. has staked an east offset to its Chanac sand discovery completed early in February. It will be the 2 Means, in SW NE 34-30s-29e.

On the southeast edge of Newhall, Los Angeles County, two tests are under way to the west of Talisman Oil Co.'s recent discovery, and a third has been staked. The discovery was completed flowing and pumping 100 bbl. daily from 45 ft. of perforations above 3,196 ft. It was the Talisman 1 Braille, a joint test with Continental Oil Co. and Macoil Corp. Talisman has a northwest offset under way and Tevis F. Morrow has started the 1 Grayson as a west offset.

At Castaic Junction, 7 miles to the northwest, Humble Oil & Refining Co. plugged back its B-1 Newhall Land & Farming Co. from 12,744 ft. to 3,900 ft. and started redrilling. Located in 12-4n-17w, the wildcat is about 1½ miles northeast from Castaic Junction field, where two deep sands have been opened, and about an equal distance southwest of The Texas Co.'s Honor Rancho field.

CALIFORNIA SUCCESSFUL WILDCATS

Kern County, west Edison area, new fault-block pool: California Exploration Co. and Macmillan Petroleum Corp. 28-2 Porter, 26-30-29e, flowed at rate of 150 bbl. daily, 21.1° gravity crude, through 12/64-in. choke, perf. 3,742-3,800 ft. and 4,061-4,158 ft., Chanac 3,500 ft., Santa Margarita 4,060 ft., TD 4,159 ft., elev. 501 ft.

Los Angeles County, Newhall area, new field discovery about ½ mile northwest of Waltz Canyon production: Talisman Oil Co. 1 Braille, 1-3n-16w, pumped at rated 100 bbl. daily, 20.4° gravity, through 45 ft. of perforations between 3,111-96 ft., TD 3,196 ft., elev. 1,320 ft.

CALIFORNIA WILDCAT FAILURES

Colusa County, south Afton area: Honolulu-Humble-Terhel Farms, 35-18n-1w, dry, TD 4,151 ft., elev. 68 ft.

Kern County, Edison area: Barnhart Morrow Consolidated 1 National Royalties, 29-30s-30e, dry, TD 734 ft., elev. 671 ft.

Tejon Hills area: Tejon Basin Oil Co. 2 "Well," 14-11n-18w, dry, TD 953 ft., elev. 1,110 ft.

Los Angeles County, Del Valle area: Brinkman Oil Operators 1 Montie, 8-4n-17w, dry, TD 3,667 ft., elev. 1,750 ft.

Devils Canyon area: Los Nietos Co. 1 Alexandar, 22-5n-17w, dry, TD 4,051 ft., elev. 1,500 ft.

Loma Verde area: Trigood Oil Co. 1 Ayala, 29-5n-17w, dry, TD 7,416 ft., elev. 1,692 ft.

San Luis Obispo County, Cuyama Valley area: R. B. Watkins 1 Luce, 14-11n-28w, Painted Rocks 1,950 ft., upper Dibblee 2,150 ft., lower Dibblee 3,460 ft., dry, TD 4,540 ft., elev. 2,469 ft.

Paso Robles area: Sunray Oil Corp.-E. A. Parkford 1 Klever, 23-27s-12e, dry, TD 2,791 ft., elev. 1,000 ft.

Taylor Canyon area: Universal Consolidated Oil Co. 54-31 Humble, 31-32s-20e, dry, TD 6,351 ft., elev. 3,535 ft.

Santa Barbara County, South Cuyama area: Bell Petroleum Co. 1 Buzzard, 25-10n-27w, top Cretaceous 5,814 ft., dry, TD 5,847 ft., elev. 2,465 ft.

Mississippi

First Oil Production For Fayette-Wilcox Pool

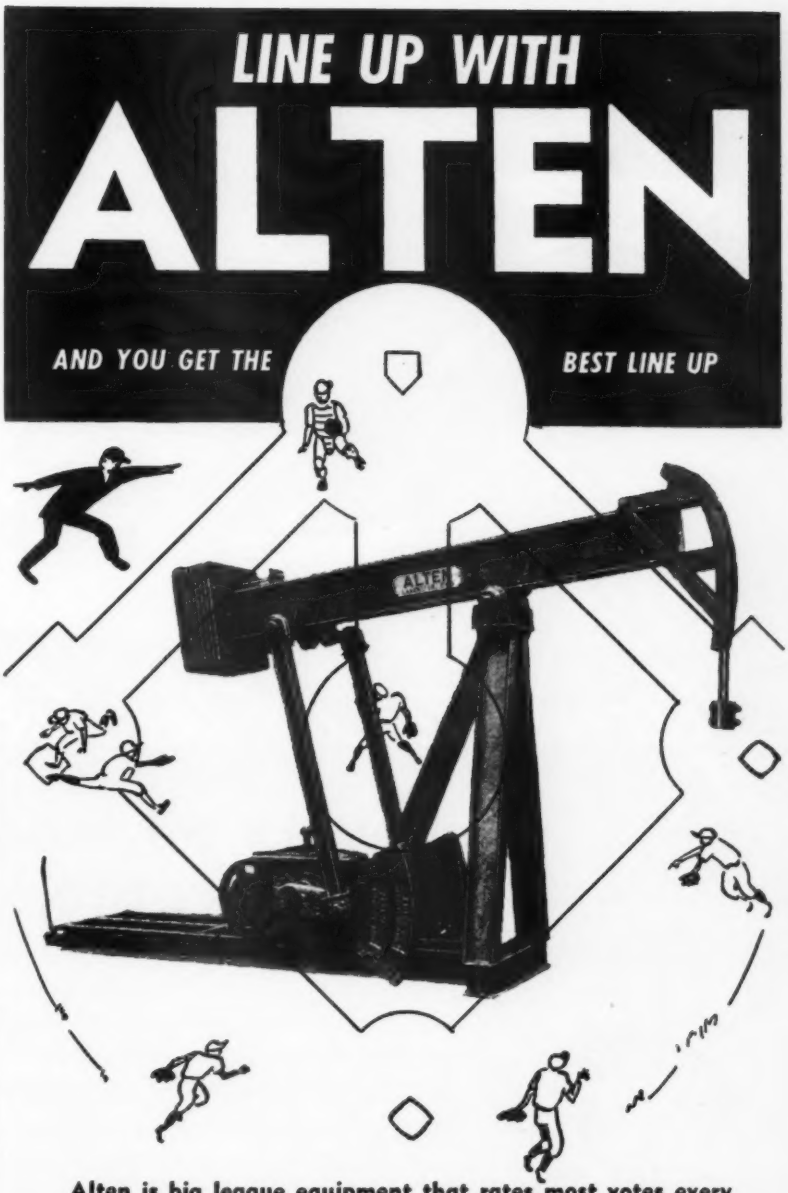
JACKSON. — Wilcox oil production has been established in Fayette field, Jefferson County, at Humble Oil & Refining Co. 3 A. M. Stewart, 27-9n-1w. On initial production tests, the well flowed at the rate of 66 bbl. of 28.9°-gravity oil daily plus 8,130 cu. ft. of gas through ⅛-in. choke. Operator perforated a saturated Wilcox sand at 3,993-96 ft. for production tests. Hole is bottomed at 6,082 ft. and has a 7-in. production pipe cemented at 4,050 ft. In addition to the zone from which the well was completed, other shows were logged higher in the Wilcox at 3,695-740 ft., but were not tested. Previous Wilcox production in Fayette field has been dry gas.

Open flow potential test has been run at Sinclair Oil & Gas Co. 1 R. T. Liddell, 67-9n-1e, Jefferson County gas-condensate discovery. This lower Tuscaloosa discovery flowed 42,600,000 cu. ft. of gas daily plus an unestimated amount of 58.2°-gravity condensate through perforations at 10,071-82 ft. Several other tests were run on various sized chokes. Through 14/64-in. choke, the well flowed 2,690,000 cu. ft. of gas daily plus 265 bbl. of condensate. Tubing pressure was 2,775 psi. and casing pressure 2,984 psi. Through 11/64-in. choke, flow was gaged at 2,300,000 cu. ft. daily plus 209 bbl. of condensate. Until an outlet is afforded for the gas, it is expected that little development will be undertaken in the area, which has been designated as South Fayette field.

A new Wilcox discovery in Wilkinson County seems assured at Jon Broks, Jr.-Petersen Drilling Co. 1 Louis Wax, 36-3n-3w. Through casing perforations at 7,299-7,302 ft. the well cleaned into pits at the estimated rate of 175 bbl. per day. Gravity of the oil was 26°. The well was shut in and tubing pressure built up to 125 psi. in 10 minutes and to 475 psi. in 3 hours. Later on the well was opened to catch a sample of the oil. It is reported that the gravity of the sample was estimated at 32°.

On the west side of Tinsley field, Yazoo County, Mississippi, Union Producing Co.-Jones-O'Brien 1 Logan, 23-10n-3w, encountered top of Smackover lime at 14,030 ft.

In Stone County, Mississippi, George Vasen 1 Tung Oil Corp., 9-2s-11w, is nearing the record for the deepest well in the world. Latest information on this wildcat is that it is being cored at 20,435 ft., which is 86 ft. short of the world's record established by Superior Oil Co. in Wyoming. (See news section).



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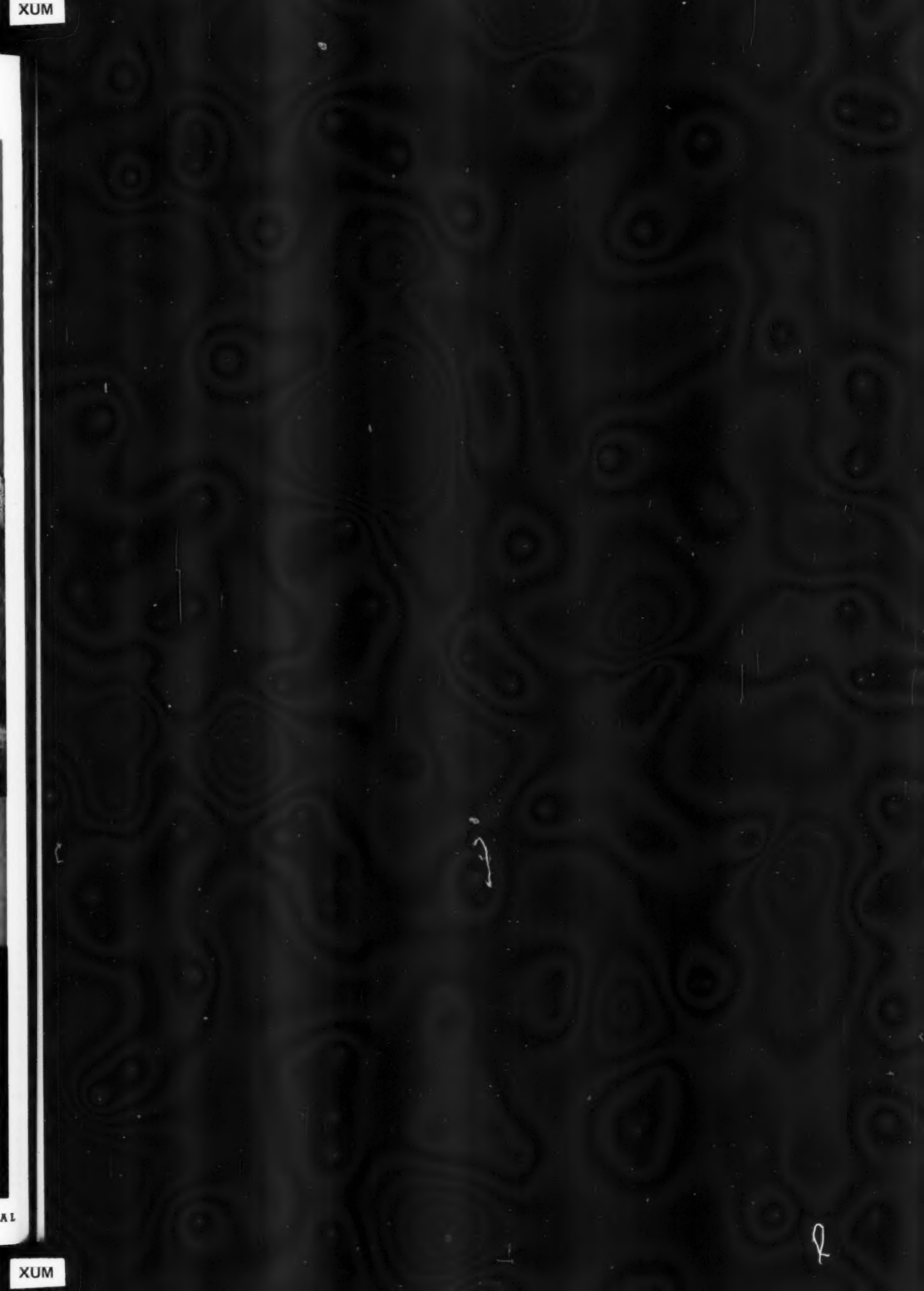

MISSISSIPPI SUCCESSFUL WILDCATS

Jefferson County: Gas-condensate discovery, "South Fayette"—Sinclair Oil & Gas Co. 1 R. T. Liddell, et al, 67-9n-1e, TD 10,278 ft., perf. lower Tuscaloosa 10,071-82 ft., IP: 42,000,000 cu. ft. of gas per day, open flow, ¼-in. choke, flowed 2,690,000 cu. ft. of gas plus 265 bbl. condensate, 58.2° gravity.

New pay at Fayette: Humble Oil & Refining Co. 3 Mrs. A. M.. Stewart, et al, 27-9n-1w, TD 6,982 ft., perf. Wilcox 3,993-06 ft., IP: 132 bbl. oil per day, ⅛-in. choke, 28.9° gravity, CP 200 psi.

MISSISSIPPI WILDCAT FAILURES

Adams County: John S. Callon - Peterson Drilling Co. 1 William C. Reed, 18-7n-2w, dry, TD 6,512 ft.

Jones County: Smith Oil Co. 1 Mrs. M. J. Sanders, et al, 32-10n-10w, dry, TD 7,000 ft.

Warren County: The Texas Co. 1 Annie B. Hinston, et al, 26-18n-5e, dry, TD 8,999 ft.

North Central Texas

Oil Discovery Completed In Fisher County's Strawn

WICHITA FALLS.—Fisher County field reports included the completion of one wildcat discovery and an increase of production in another wildcat still in the testing stage.

On the completion list was General Crude Oil Co. 1 David A. Ulmer, about 8 miles northwest of Hamlin, which made a flowing potential of 108 bbl. of 39°-gravity oil a day through ¼-in. choke, from Strawn sand at 5,125-40 ft., open hole. The new well is in the northeastern part of the county.

Meanwhile Stanolind Oil & Gas Co. 1 Glass, east of Pyron, had more oil on its last test of the Ellenburger at 7,328-47 ft. Flowing through 13/64-in. choke, the well produced 130 bbl. of oil in 23 hours, compared with an earlier 24-hour test of 119 bbl. of oil through the same size choke.

North of Eskota, Lion Oil Co. 1 Lanning, Ellenburger wildcat, was drilling ahead after recovering 90 ft. of slightly oil and gas-cut mud on a 1-hour drill-stem test from 5,783-5,824 ft.

In Stonewall County, U. S. Smelting, Mining & Refining Co. 1 Patterson, wildcat northwest of the Carlisle - Pennsylvanian field, was waiting on orders after recovering salt water on a drill-stem test in Pennsylvanian reef from 5,300-25 ft.

DeSoto Oil Co. 1 Chambless, northeast extension attempt to the Guest Canyon sand field discovery, missed the pay and was dry at 4,800 ft.

Southwest of North Knox City field, Knox County, Stanolind Oil & Gas Co. was drilling ahead below 4,770 ft. after testing salt water from 4,699-4,733 ft.

W. A. Moncrief & Sons 1 H. H. McConnell, northeast Jack County wildcat, was testing the Bend conglomerate at 5,113-31 ft.

In Haskell County, Humble Oil & Refining Co. had prospects of Bend conglomerate production at its 1 Harrell Drilling Co., southeast of Rochester. A 75-minute drill-stem test in the top of the Bend from 5,699-5,715 ft. had gas in 10 minutes and recovered 2,200 ft. of oil, plus 170 ft. of oil and gas-cut mud. There was no formation water.

NORTH TEXAS (DISTRICTS 9 AND 7-B) SUCCESSFUL WILDCATS

Archer County: Palmer and Snebold 1 Chas. Meurer, 99-4-Clark & Plumb, 3½ mi. NW Windthorst, TD 3,541 ft., pay 3,529 ft., IP 5 bbl. 41°-gravity oil.

Coleman County: United North & South Development Co. 1 O. O. McWilliams, J. V. Makey Sur. 9, 5 mi. NE Talpa, TD 3,600 ft., perforated 3,549-57 ft., IP flowed 122 bbl. 45°-gravity oil a day, 14/64-in. choke, TP 210 psi., GOR 375 cu. ft.

Cooke County: Acme Equipment, Inc. 5 W. F. Solomon West Ranch, A-976-3-SPRR, 7 mi. NW Muenster, TD 2,468 ft., pay 2,464 ft., IP pumped 86 bbl. 42°-gravity oil a day, GOR 400 cu. ft.

Fisher County: General Crude Oil Co. 1 D. A. Ulmer, 102-1-H&TC, 8 mi. NW Hamlin, TD 5,140 ft., pay 5,125-40 ft., IP flowed 108 bbl. 39°-gravity oil a day, ¼-in. choke, GOR 500 cu. ft., TP 175 psi.

Moutray-Moore Drilling Co. 1 J. L. Sharp, Sec. 207, BBB&C Sur., 1 mi. W Hamlin, TD 3,841 ft., Swastika 3,810 ft., IP 3,250,000 cu. ft. gas.

Jones County: R-H-K Drilling Co. et al 1 R. T. Bennett, 26-149-DeWitt CSL, TD 4,646 ft., Strawn pay 4,554 ft., IP flowed 205 bbl. 41°-gravity oil a day, ¼-in. choke, GOR 518 cu. ft., TP 450 psi.

Parker County: T. W. Doswell et al 1 C. L. Hudson, J. F. Bates Sur., 15 mi. SW Weatherford, TD 2,310 ft., gas pay 2,035 ft., IP 1,000,000 cu. ft.

Shackelford County: Deep Rock Oil Corp. 3 Conway, Sec. 183, ETRR Sur., 12 mi. NW Albany, TD 1,960 ft., pay 1,554 ft., IP pumped 47 bbl. 37°-gravity oil a day.

Stephens County: F. R. Hanrahan 1 J. C. Thompson, 86-6-T&P, 3½ mi. SW Frankell, TD 2,030 ft., pay 2,020 ft., IP pumped 10.6 bbl. 39°-gravity oil a day.

Taylor County: Drilling & Exploration Co., Inc. 1 W. C. Bryan, 73-19-T&P, 1½ mi. SW Blair, TD 2,993 ft., pay 2,966 ft., IP pumped 20 bbl. 41°-gravity oil a day.

Young County: Maynard & Maynard 4 Allar Co., A. Hines Sur., 5 mi. NE Murray, TD 3,646 ft., perforated Caddo 3,616-36 ft., IP pumped 19 bbl. 39°-gravity oil a day.

Warren Oil Corp. 1 O. D. Swanzy, TE&L Sur., ½ mi. E Olney, TD 4,950 ft., Mississippian 4,876 ft., perforated 4,900-18 ft., IP flowed 154 bbl. 42°-gravity oil a day, 16/64-in. choke, TP 110 psi., GOR 770 cu. ft.

NORTH TEXAS (DISTRICTS 9 AND 7-B) WILDCAT FAILURES

Archer County: L. T. Burns 1-A Garvey, TE&L Sur., 6 mi. SW Windthorst, dry, TD 5,550 ft.

R. W. Darden 1 Estell-Key, W. E. Probert Sur., 1 mi. NE Megargel, TD 1,432 ft.

Fortex Oil Corp. 1 Percy Jones, AB&M Sur., 6 mi. S Mankins, dry, TD 1,792 ft., Gunsight 1,695-1,700 ft.

W. A. Loftin and Frank Mort 1 R. L. Kempner, SPRR Sur., 1 mi. NW Holliday, dry, TD 1,855 ft.

Ralph Myers Contracting Corp. 1 J. H. Robertson, John Llewellyn Sur., 10 mi. SW Archer City, dry, TD 5,264 ft., elev. 1,085 ft., Palo Pinto 3,123 ft.

Callahan County: Landreth & Watson 1 I. N. Jackson, ETRR Sur., 8 mi. N Baird, dry, TD 1,371 ft.

Clay County: Hull Oil Co. 1-A Allen Rodgers "A," McGowan & Young Sur., 3 mi. NW Petrolia, dry, TD 1,163 ft.

Larson & Thomas 1 E. E. Brown, TE&L Sur., 2½ mi. S Antelope, dry, TD 3,994 ft.

Coleman County: J. Ralph Stewart 1 R. S. See, Caldwell CSL, 11 mi. SE Santa Anna, dry, TD 2,326 ft., Ellenburger 2,058 ft.

Cooke County: Acme Equipment, Inc. 3 W. F. Solomony West Ranch, SPRR Sur., 7 mi. NW Muenster, dry, TD 2,660 ft.

John R. Dillon 1 W. E. Fortenberry, GH&H Sur., 2 mil. SW Rosston, dry, TD 4,392 ft.

Republic Natural Gas Producing Co. 1 Leta Houston, SA&MG Sur., 5½ mi. NE Gainesville, dry, TD 5,604 ft.

S. W. Sims 1 Opal C. Berry, R. H. Estes Sur., 3 mi. N Rosston, dry, TD 4,005 ft.

Trumter Petroleum Corp. 1 O. B. Anderson, E. C. Young Sur., 4 mi. S Era, dry, TD 2,102 ft.

Haskell County: John R. Black 1 Brooke Early, B. T. Morgan Sur., 13 mi. SE Stamford, dry, TD 4,965 ft., Swastika 1,772 ft., Gunsight 2,016 ft., Palo Pinto 3,250 ft.

(Continued on page 154)

Eastern Texas

Gas-Distillate Discovery For Anderson County

DALLAS.—Continental Oil Co. completed its 1 Frank Carroll, 3 miles south of the Tennessee Colony field, as a Rodessa gas-distillate discovery.

The Anderson County wildcat produced 204 bbl. of high-gravity oil a day through 14/64-in. choke, with gas gaged at 3,269,000 cu. ft. daily. Producing perforations were from 8,814-24 ft.

Northeast of the Tennessee Colony field Big Chief Drilling Co. 1 Hughes was scheduled for dual completion from the Pettit between 9,669-97 ft., and the Rodessa from 8,892-8,900 ft. Oil production from the upper zone was gaged at 10 bbl. an hour through ⅛-in. choke, with gas-oil ratio of 1,600 cu. ft. The well made gas and distillate, which was not gaged, from the lower formation.

Applications for seven new wells in Falls County, including one wildcat, will continue the active shallow play which started near the town of Lott within the past few months. The exploratory application was G. E. Litteral 1 Claud Asher, to be drilled on a 121-acre tract in the S. W. Jordan Survey, 2 miles west of Lott. Other locations were near the Lott townsite.

In Limestone County, The Texas Co. 1 Lulu Mason, J. L. Chavert Survey, was testing perforations at 6,788-6,804 ft. in the Rodessa. The prospective discovery gaged 3,600,000 cu. ft. of gas daily plus 60 bbl. of distillate. Earlier testing yielded gas and distillate from perforations at 6,924-32 ft. in the middle Rodessa.

Two extensions were nearing completion stage in the Sandusky field of Grayson County. H. F. Gibson 1 G. P. Webb, McLeon Survey, was running tubing to test the Ellenburger from bottom of casing at 7,561 ft. and 7,605 ft., total depth. The well had shown for a producer, and is 4,500 ft. northwest of nearest production.

The Texas Co. 2 Scarborough, Scarborough Survey and south extender in the Oil Creek pay, flowed 163 bbl. of 42°-gravity oil in 8 hours, for a calculated daily potential of 488 bbl. Perforations were from 7,157-62 ft.

EAST TEXAS (DISTRICTS 5 AND 6) SUCCESSFUL WILDCAT

Shelby County: Lion Oil Co. 1 G. W. Hanson Sur., 3 mi. N Jauquin, TD 6,250 ft., elev. 204 ft., perforated lower Pettit 6,175-6,200 ft., IP 25 bbl. distillate, 2,500,000 cu. ft. gas a day, ¼-in. choke on tubing.

EAST TEXAS (DISTRICTS 5 AND 6) WILDCAT FAILURES

Anderson County: D. A. McCray 1 Southern Pine, T. M. Jones Sur., 9 mi. NE Slocum, dry, TD 5,310 ft.

Falls County: P. W. Curry 1 B. A. Neuman, P. Zarza Sur., 5 mi. NW Chilton, dry, TD 994 ft., Buda 860 ft., Georgetown 960 ft.

Day Oil Co. 1 John Engel, N. K. Robinson Sur., 2 mi. NW Travis, dry, TD 1,319 ft., Buda 1,302 ft.

E. M. Dodson 1 R. Burton, N. Slatter Sur., 10 mi. SW Marlin, dry, TD 2,228 ft., Buda 1,865 ft.

Jack D. Collins 1 A. Hoelcher, J. H. Harvey Sur., 6 mi. S Lott, dry, TD 1,685 ft., elev. 491 ft., Buda 1,195 ft., Georgetown 1,285 ft.

Fannin County: Goss Development Co. 1 J. B. Johnson, C. M. Jones Sur., 2½ mi. SW Telephone, dry, TD 2,518 ft.

Houston County: Hinton, Lake & Spence 1 C. L. Walters, Juan LaRivere Sur., 10 mi. W Grapeland, dry, TD 6,050 ft.

Hinton, Lake & Spence 2 Walters, 1,320 ft. SW No. 1, dry, TD 5,567 ft., Austin chalk 5,455 ft.

Navarro County: Louis T. Daniels 1 E. F. Bain, R. D. Newman Sur., 5 mi. NE Kerens, dry, TD 3,308 ft., Woodbine approximately 3,295 ft.

Panola County: O. B. Siler 1 Fonville, A.

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Booker Sur., 7 mi. SE Deadwood, dry, TD 3,315 ft.

Red River County: Carlton Drilling Co. and H. L. Richards, I. Kuykendall Sur., 1 mi. SW Bagwell, dry, TD 1,865 ft.

Wood County: A. V. Erwin 1 W. W. Thompson, F. L. Smith Sur., 2 mi. S Winnsboro, dry, TD 5,255 ft. in the Woodbine.

Michigan

Osceola County Has Dundee Discovery

MOUNT PLEASANT.—Gas showed in 16 minutes, and 340 ft. of clean oil and 90 ft. of oil-cut mud showed in 65 minutes on drill-stem test of the Dundee dolomite section at Mogul Oil Co. 1 Hammar, wildcat located in SW SW NE 20-20n-9w, Sherman Township, Osceola County.

Dundee dolomite top was logged at 3,861 ft. Coring was started at 3,845 ft. and oil saturation was found in the core from 3,862-70 ft. No evidence of water was showing in either the core or on the drill-stem test. Well was still in dolomite, with evidence of continued porosity, when the coring to 3,870 ft., present total depth, was completed. Bottom-hole pressure on drill-stem test was reported at 1,200 psi.

Wildcat will be cased with 5-in., cleaned out and acidized at its present depth. Hole was reamed to the total depth and 5-in. casing will be swung and cemented above the top of the Dundee at about 3,849 ft.

Mogul's Sherman Township wildcat has been the most "red hot" wildcat in Michigan since top markers were logged about 2 weeks ago, some 30 ft. higher than these same upper markers in surrounding dry holes. On the top of the Dundee well was from 21 to 60 ft. higher than surrounding correlating points. This play was assembled by I. W. Hartman, Mount Pleasant independent producer, and he in turn farmed out acreage to Mogul for this test. Mogul's drilling block includes 660 acres around the test, while Hartman controls a lease spread of about 860 acres, including several offsets.

The bulk of the acreage in the play is controlled by independent companies, including Rex Oil & Gas Co., George F. Herr, Leonard Oil, Inc., W. H. Strickler, Aurora Gasoline Co., American Oil Co., and Evart Oil & Gas Co. Cities Service Oil Co., Gulf Refining Co., and Pure Oil Co., among the majors, have outside acreage that may be in the play if a field of any size is developed in the district.

The new wildcat oil strike is located about 13 miles northeast of Reed City oil pool, 8 miles due north of Rose Lake-Traverse oil pool.

MICHIGAN WILDCAT FAILURES

Allegan County, Cheshire Township: Sewage Sanitation Co. 1 Ciskowski, W½ SE NE 33-1n-14w, Traverse 1,273 ft., dry, TD 1,295 ft.

Manlius Township: Ford Oil Co. 1 Brink, NE SW SE 5-3n-15w, Traverse 1,457 ft., dry, TD 1,460 ft.

Isabella County, Deerfield Township: Swan-King Oil Co. and Basin Oil Co. 1 Claus, NW NE NE 1-14n-5w, Dundee 3,747 ft., dry, TD 3,783 ft.

Newaygo County, Sheridan Township: Mcclure Oil Co. 1 Bultman, NE NE SE 1-12n-14w, Traverse 2,335 ft., dry, TD 2,345 ft.

Oceana County, Claybanks Township: Turner Petroleum Corp. 1 Fordham, SE SE NW 27-13n-18w, Dundee 2,047 ft., dry, TD 2,069 ft.

Roscommon County, Higgs Township: Brazos Oil & Gas Co. 1 State-Higgins, NE N½ NW SE 21-24n-2w, dry, TD 4,470 ft.

Van Buren County, Geneva Township: Cook Drilling Co. 1 Culver, NE SE NW 1-1s-16w, Traverse 1,55 ft., dry, TD 1,157 ft.

Keeler Township: Merrill Drilling Co. 1 Pierson, NE NE NW 29-4s-16w, Traverse 885 ft., dry, TD 898 ft.

Rocky Mountain

North Dakota Wildcat Tests Oil and Gas

DENVER.—Tests are being continued on what may be the first commercial well in North Dakota. Amerada Petroleum Corp.'s wildcat in the Beaver Lodge area, Williams County, North Dakota, flowed at the rate of 7,096,000 cu. ft. of gas daily with a spray of oil after acid treatment of the zone 11,630-11,660 ft. The well is 1 Iverson, C SW SW 6-155n-95w, on the large Nesson anticline through Williams and McKenzie counties in the deep portion of the Williston basin. (See lead page of exploration section).

The well was drilled to 11,744 ft., total depth, and the operator has been perforating casing, cemented on bottom, and testing the lower zone. The well showed some gas in lower perforations and the operator acidized the present zone with 4,000 gal. prior to the above test. The well found Kinderhook at 9,820 ft., Three Forks (Devonian) 9,922 ft., and Jefferson (?) at 10,110 ft.

This is the first well in North Dakota to find important oil and gas shows, and it is expected that the state will have a more active exploratory drilling campaign as a result of these shows. Estimates of acreage leased through the basin are now as high as 14,000,000, with most major operators, as well as a number of independent companies, having large lease holdings. During recent months the play has extended eastward beyond previous lease area, with Sinclair Oil & Gas Co., Magnolia Petroleum Co. and Carter are now drilling a wildcat in the St. Antony area, Morton County, with the well a completely tight hole and no release of depths or other information. Additional exploratory drilling is expected this year.

General Petroleum Corp.'s wildcat, 4X12G, SW SW NW 12-28n-114w, in the Tip Top area, Sublette County, Wyoming, flowed 1 hour 50 minutes on drill-stem test from the Nugget this week. The test was made between 9,688-9,728 ft. where the operator cored more than 42 ft. of saturated sand in Nugget, topped at 9,676 ft. General Petroleum will core ahead in the Nugget.

This wildcat is located on a block north of LaBarge field, where production is found in Tertiary sands at shallow depth. The general area on the west side of the Green River basin has considerable overthrust faulting, and previous wells through this area have been failures in the lower zones. The present production may start an active drilling campaign along the west side of the Green River basin, which has been comparatively dormant for the past few years. During the past week Helmerich & Payne, Inc., of Tulsa completed a deal with Stanolind Oil & Gas Co. and Carter Oil Co. for a farmout on the 13,000-acre East LaBarge block, townships 26n and 27n, Range 112w, southeast of the Tip Top wildcat. Helmerich & Payne are expected to start a deep test in the area in the near future.

COLORADO WILDCAT FAILURE

DeNova area, Washington County: J. E. Manning 1 Brown-Ayres, C NW NE 31-2s-50w; 4,359 ft. TD; dry. Niobrara 2,980 ft., Greenhorn 3,624 ft., first Graneros sand (D) 3,917 ft., second Graneros sand (J) 3,970 ft. (sample), Cloverly 4,262 ft., Morrison 4,328 ft.

WYOMING WILDCAT FAILURES

North James Lake, Albany County: Stanolind Oil & Gas Co. 1 Ethel I. Dykes, C SW NE 26-19n-76w; 9,926 ft. TD; dry. Fronties 7,385 ft., Muddy 8,050 ft., Dakota 8,157 ft., Lakota 8,205 ft., Forelle 9,350 ft., Tensleep 9,700 ft.

Bonanza, Big Horn County: Gulf Oil Corp. 1 Government, NE NW NE 35-49n-91w; 4,017 ft. TD; dry. Morrison 1,040 ft., Sundance 1,420 ft., Gypsum Springs 1,730 ft., Chugwater 1,885 ft., Dinwoody 2,665 ft., Phosphoria 2,762 ft., Tensleep 2,932 ft.,

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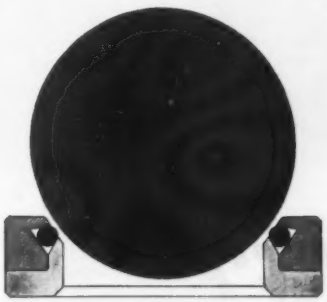

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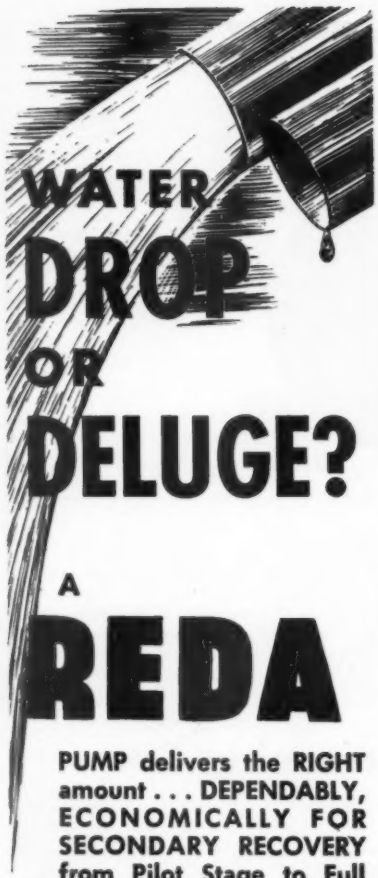

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BARTLESVILLE, OKLAHOMA

Amsden 3,151 ft., Madison 3,370 ft., Base Madison 3,996 ft.

North Salt Creek, Johnson County: Continental Oil Co. 1 Parsons-Sheep, NW SW NW 11-41n-79w; 2,665 ft. TD; dry. Sussex 1,500 ft., Shannon 1,945 ft., "K" sand 2,620 ft.

Castle Creek, Natrona County: Continental Oil Co. 7 Unit, NW NE NE 23-38n-81w; 2,470 ft. TD; dry. Niobrara 937 ft., first Wall Creek 1,500 ft., second Wall Creek 1,800 ft., third Wall Creek 2,304 ft.

NEBRASKA WILDCAT FAILURE

South Sidney, Cheyenne County: Perl Smith 1 Hand, SW SW SW 32-13n-49w, 5,288 ft. TD; dry. Niobrara 3,873 ft., Codell 4,243 ft., Greenhorn 4,415 ft., "D" sand 4,667 ft., "G" sand 4,720 ft., "J" sand 4,794 ft., Skull Creek 4,858 ft., "M" sand 4,996 ft., "O" sand 5,045 ft., "R" sand 5,105 ft., "T" sand 5,190 ft., Morrison 5,200 ft.

MONTANA WILDCAT FAILURES

Winifred area, Fergus County: Hauge 1 Truesdall, NW NW SE 34-21n-18e; 895 ft. TD; suspended.

West Yellowstone, Gallatin County: Kornowski 1 Government, NE SW SW 21-13s-5e; 1,061 ft. TD; suspended.

Government Creek, Liberty County: Arch Apex Corp. 1 Lewis, NE SW SE 2-35n-5e; 2,649 ft. TD; suspended.

Devils Basin, Musselshell County: Cloverleaf Petroleum Co. 2 Morton, NE NE NE 26-11n-24e; 1,275 ft. TD; suspended.

Devils Pocket, Musselshell County: William Hanlon 1 Government, NW NW NW 10-10n-22e; 2,162 ft. TD; suspended.

Vanada area, Rosebud County: Burt Nelson Oil & Development 1, NW NE NW 34-7n-18e; 686 ft. TD; suspended.

Six Shooter area, Sweetgrass County: Best Petroleum Co. 2 NPRR, SW SW SW 11-3n-18e; 4,109 ft. TD; suspended.

Shawmut, Wheatland County: Mon-O-Co. 1 Erickson, SE NW NW 24-7n-18e; 4,352 ft. TD; suspended.

South Louisiana

Failure at New Cowpen Creek Field

NEW ORLEANS.—Efforts to confirm oil production at the new Cowpen Creek field, Beauregard Parish, failed at Fidelity Oil & Royalty Co. 2 Edgewood Land & Log Co., 18-6s-9w. The well, located ½ mile west of the field discovery, was dry at 9,100 ft. Operator's 1 Edgewood Land & Log Co. was completed in February of this year for 167 bbl. of 43.8°-gravity oil daily through perforations at 8,522-46 ft.

Arthur Silberman 1 Beaubeouf, 4-4n-2e, Rapides Parish, west outpost to Big Island field, flowed 700 bbl. of pipe-line oil daily through perforations in the Wilcox at 5,541-47 ft. Production was gaged through 24/64-in. choke. Hole is bottomed at 5,572 ft.

Humble Oil & Refining Co. has spudded 1 Louisiana Land & Exploration Co. "B," Terrebonne Parish wildcat, 13-20s-14e. The wildcat, scheduled to go to 14,000 ft., is located in the Lake Merchant area.

Sinclair Oil & Gas Co. has staked locations for two new wildcats in South Louisiana, one in Avoyelles Parish and the other in Pointe Coupee. Contract has been awarded for 1 Turner Lumber Co., 29-2s-6e, proposed 13,000-ft. venture, located 1 mile west of Woodside in Avoyelles Parish. Second venture is 1 S. N. Garrett, et al, 30-6s-10e, Pointe Coupee Parish, which will be drilled to 9,500 ft. It is located in the Torbert area.

Union Sulphur & Oil Corp. has announced plans to drill a 14,000-ft. wildcat in the Labadieville area of Assumption Parish. Designation is 1 E. G. Robichaux Estate, 100-14s-15e.

SOUTH LOUISIANA WILDCAT FAILURE

Terrebonne Parish: Warren Oil Corp. 1 Ruby Thibodeaux, 105-17s-17e, dry, TD 10,503 ft.

Texas Gulf Coast

Luling Sand Discovery In North Karon Field

HOUSTON.—In North Karon field, Live Oak County, Tide Water Associated Oil Co. 1 Hicks Williams has established oil production for the area in the lower part of the Luling sand. The well flowed at the rate of 100 bbl. of 38.4°-gravity oil daily through 7/16-in. choke. Tubing pressure was 860 psi. and casing pressure 600 psi. Production was through perforations at 7,378-80 ft.

In addition to approximately 20 ft. of oil show in the Luling, the new discovery also had indicated a 50-ft. section of gas-condensate pay in the same sand, and had some oil and gas shows in the Massive. The well is located 1,600 ft. west of Henderson Coquat 1 Curry, gas-condensate discovery for the area. It is in F. G. Hines Survey, Abstract 643, 7 miles northeast of Oakville.

About 10 miles northeast of Chapel Hill in Washington County, Sinclair Oil & Gas Co. is coring below 9,520 ft. in sandy shale at 1 Bess Henry, a scheduled 10,500-ft. wildcat in William Gates Survey, Abstract 46.

In Montgomery County, Sinclair is reported preparing to run a drill-stem test at 1 Martin Estate, wildcat test located 1 mile northeast of Jackson. The hole is bottomed at 10,257 ft. On a previous drill-stem test from 9,985-10,003 ft., using 500-ft. water cushion and ¼-in. chokes, well had good blow and recovered water cushion, and 360 ft. of oil and gas-cut mud.

H. J. Porter has deepened his A-3 Yaussi, original gas discovery well in West Cordele field, Jackson County, and recompleted for oil production in a new pay zone for the field. Originally, the well was completed for 72,000,000 cu. ft. of gas per day through perforations at 2,725-27 ft. Operator deepened the hole to 2,805 ft. and set 4-in. liner to 2,801½ ft. From perforations at 2,798-99 ft., the well flowed 20 bbl. of oil per day through 5/64-in. choke. Tubing pressure was 250 psi. and casing pressure was 1,100 psi. Gravity of the oil was 21°. The well is located in John McWhite Survey, Abstract 268.

TEXAS GULF COAST (DISTRICTS 2 AND 3) SUCCESSFUL WILDCATS

Jackson County: New pay at West Cordele—H. J. Porter 3 Rudolph Yaussi est., et al, John McWhite Sur., A-268, TD 2,805 ft., perf. 2,798-99 ft., IP: 20 bbl. oil per day, 5/64-in. choke, 21° gravity, TP 350 psi., CP 1,100 psi. (This is original discovery of West Cordele field, which was completed last year as gas discovery through perforations at 2,725-27 ft. Old TD 2,796 ft.).

Jefferson County: Oil discovery—The Texas Co. 1 Crow, et al, Seth Davis Sur. 172, TD 4,593 ft., perf. 3,602-13 ft., IP: 130 bbl. per day, 9/64-in. choke, TP 475 psi., 37.6° gravity.

Refugio County: New pay at Rooke—Plymouth Oil Co. 1 A. D. Rooke, et al, J. M. Aldrete Sur., TD 9,036 ft., perf. Vicksburg 9,020-32 ft., IP: 3,300,000 cu. ft. of gas per day, open flow, SIP 2,252 psi.

Wharton County: Gas discovery—Republic Natural Gas Co. & Chas. H. Osmond 2 Beck-Rasmussen, J. Mitchell Sur., A-651, TD 3,222 ft., perf. 2,598-605 ft., IP: 5,400,000 cu. ft. of gas per day, open flow, SIP 1,098 psi.

TEXAS GULF COAST (DISTRICTS 2 AND 3) WILDCAT FAILURES

Bee County: Rock Hill Oil Co., DeLange & Rowe 1 Ike M. Singer, J. I. Clare Sur., A-448, dry, TD 4,405 ft.

Union Sulphur & Oil Corp. 1 J. H. Ray, et al, John Williamson Sur., A-321, dry, TD 4,025 ft.

Harris County: Frances M. Blair, Jr., 1 Keller, et al, William Whitlock League, 5 mi. NW of Crosby, dry, TD 9,034 ft.

San Jacinto County: Commercial Petroleum & Transport Co. 2 Ellison-Kirby Vital Flores Sur., A-14, dry, TD 4,626 ft.

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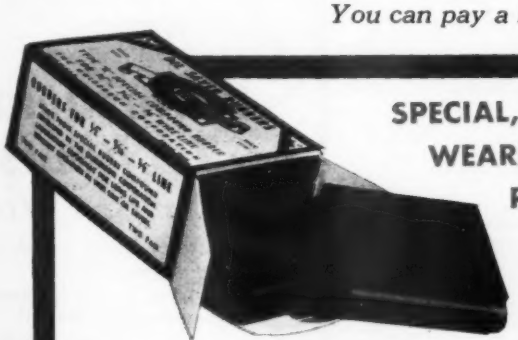

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Southwest Texas

Significant Buda Lime Strike in Wilson County

CORPUS CHRISTI.—Potential gage has been run on Wilson County's new Buda lime discovery, H. J. Mosser, et al, 1 Clarabel DeWees Remschel, Manuel Barrera Grant, Abstract 4. The well flowed 560 bbl. of 30°-gravity oil per day through ¼-in. choke from the Buda lime. Production is through holes from 200 bullet shots and 219 jet shots at 7,715-805 ft. Top of the pay was reported at 7,710 ft. Gravity of the oil was originally reported to be 19°, but potential reports showed it to be 30°. The well was acidized with 22,000 gal. in several stages and the flow steadily improved.

John H. Foster 1 Mrs. Grohman, new Serpentine discovery near North Cedar Creek field in Bastrop County, has been potentialed for 119 bbl. of oil per day on pump. Completion was made from open hole at 1,570-607 ft. Top of the Serpentine plug in this discovery was 1,595 ft. The well is located in J. A. Navarro Survey, 1½ miles northwest of Cedar Creek townsite. The operator's 2 Grahman, 945 ft. southwest of the 1 well, is testing for completion below the 5½-in. casing set to 1,585 ft. on the Serpentine plug.

George W. Graham & Ryan, Hays and Burke 1 Mrs. E. G. Brown, wildcat in the Mud Flats area of Aransas County, is reported to have cored sand with good show of oil at 9,125-40 ft., but failed to establish production on drill-stem test of this section. Other shows were indicated farther up the hole on electrical log and side-wall samples, one being around 8,000 ft. and another at approximately 7,700 ft. The cores in the 8,000-ft. sand had condensate odors, but sand was very tight, with no permeability. This wildcat is located in Lot 6, Section 51, sixth subdivision of Taft Farm Lands.

Lone Star Producing Co. 2 Sarah E. Ferry, confirmation venture to Lone Star 1 Ferry, Edwards lime discovery in Atascosa County, is at total depth of 8,135 ft. in lime. Operator is currently running drill-stem test on the well. The 1 Ferry was completed through perforations at 8,208-30 ft. The 2 Ferry is located ½ mile southwest of the discovery well.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) SUCCESSFUL WILDCATS

Frio County: Oil discovery, "Goldfinch"—Milam Drilling Co. 1 J. C. Cox, Albert Fisher Sur. 229, TD 4,630 ft., open hole (Navarro) 4,617-30 ft., IP: 63 bbl. oil per day, 3/16-in. choke, 35.5° gravity, TP 150 psi., CP 260 psi.

Jim Hogg County: Oil discovery—Sun Oil Co. 13 A. C. Jones, "Auga Nueva de Abajo," J. M. Ramirez Sur., A-258, TD 4,835 ft., perf. Hockley 4,789-91 ft., IP: 45 bbl. oil per day, 9/64-in. choke, 40.2° gravity, TP 600 psi., CP 975 psi.

McMullen County: Oil discovery—Sunray Oil Corp. 1 J. E. Murphy, J. C. King Sur. 110, A-1134, TD 3,065 ft., open hole (Pettus) 3,061-65 ft., IP: 16 bbl. oil per day on mpump, 21.4° gravity.

SOUTHWEST TEXAS (DISTRICTS 1 AND 4) WILDCAT FAILURES

Aransas County: Goldston Oil Corp. 1 H. E. Dickinson, J. Fessender Sur., A-65, dry, TD 8,020 ft.

Atascosa County: W. W. Carter, et al, 1 Milton Davis, Solomon Simmonds Sur. 1,439, A-767, dry, TD 4,989 ft.

Dimmit County: Howeth and Mason 1 George Light, I&GN RR Sur., Block A, A-529, dry, TD 6,005 ft.

Frio County: Hassie Hunt Trust 1 Emma Shiner, S. W. Thomas Sur. 12, A-984, dry, TD 5,767 ft.

Jim Hogg County: Sun Oil Co. 14 A. C. Jones, "Agua Nueva de Abajo" J. M. Ramirez Sur., A-258, dry, TD 4,649 ft.

Kenedy County: Sun Oil Co. 1 Dunn-McCampbell, Nicholas & Juan Jose Balli Sur., on Padre Island, dry, TD 9,002 ft.

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LaSalle County: Well Service & Drilling Co. of Texas 1 E. L. Beckham, et al, H&GN R RSur. 120, A-1064, dry, TD 5,608 ft.

Milam County: Pryor Dillard 1 William Crenan estate, William Cowan Sur., dry, TD 2,464 ft.

Roland B. Paxson, et al, 1 Herman Fuessel, Abigail Fokes Sur., dry, TD 1,056 ft.

San Patricio County: The Chicago Corp. A-2 Odem, Archibald Herron Sur., A-166, dry, TD 4,200 ft.

Webb County: Sid Katz & W. E. Fox, Tr., 1 Giluli B. Moglia, Jr. Poitevent Sur. 722, 9 mi. N of Bruni, dry, TD 3,566 ft.

Zapata County: Bonner & Thompson 1 V. I. Vidourri, Dolores Subd. of Borrego Grant, dry, TD 3,025 ft.

Louisiana-Arkansas

Miller County Test May Open New Pool

SHREVEPORT.—Skelly Oil Co. has a prospective discovery at its 1 Louis Heilbron, 28-16s-26w, Miller County. Crew set 5½-in. casing on bottom at 4,281 ft., and prepared to test at a different level than produces in Fouke field about 1 mile to the south. Operator cored 8½-9 ft. of sand with oil odor and stain at 3,467-77 ft.

In Union County, West Urbana field has prospects of a new producing horizon. Roberts Petroleum Co. 1 Sledge, 6-18s-13w, tested 200 bbl. of 28°-gravity oil plus some salt water from the interval at 2,973-93 ft.

North Louisiana.—Another new pay has been opened in Simsboro field of Lincoln Parish. Pan-Am Southern Oil Co. and Murphy Corp. 2 Givens, 2-17n-4w, was dually completed for a total potential of 27,900,000 cu. ft. of gas per day. The well made an open flow potential of 4,400,000 cu. ft. of gas from the Hill sand at 5,438-64 ft. (bottom-hole pressure, 2,449 psi.), and open flow of 23,500,000 cu. ft. of gas from the Fowler sand at 5,332-52 ft. (bottom-hole pressure, 2,218 psi.).

NORTH LOUISIANA WILDCAT FAILURES

Bienville Parish: Hercules Petroleum Corp. 1 fee, 970 ft. S and 138 ft. E NWc NE SE 16-18n-7w, dry, TD 1,330 ft., to tops reported.

Concordia Parish: R. A. Campbell et al 1 Winston, 2,310 ft. S and 1,729 ft. W NEc 28-6n-9e, dry, TD 7,024 ft., no tops reported.

LaSalle Parish: Placid Oil Co. 2 State of Louisiana-Catahoula Lake "C," 3,300 ft. S and 6,000 ft. E NWc of Sec. 16—in Sec. 14-6n-3e, dry, TD 4,450 ft., no tops reported.

ARKANSAS SUCCESSFUL WILDCAT

Nevada County: Warmack et al 1 Weaver, 150 ft. S and 75 ft. W NEc W/2 SE SW 17-14s-21w, pumped 5 bbl. of 13°-gravity oil per day from Nacatoch at 1,192-1,200 ft., TD 1,202 ft.

ARKANSAS WILDCAT FAILURE

Union County: McCain et al 1 West, C NE SE NE 20-19s-13w, dry, TD 3,612 ft., Midway 1,552 ft., Arkadelphia 2,096 ft., Nacatoch sand 2,279 ft., Saratoga 2,380 ft., base Annona 2,553 ft., Lower Cretaceous 2,910 ft., James 2,988 ft., Travis Peak 3,418 ft.

Appalachian-Ohio

Leidy Gas Field Test Is Dry

PITTSBURGH.—In Leidy Township, Clinton County, north central Pennsylvania, Dorcie Calhoun 1 Leah Calhoun, elevation 906 ft., resulted in salt water. The Onondaga lime was topped at 6,092 ft., Oriskany sand 6,121 ft., water at 6,15 ft., total depth 6,128 ft. Mid-Atlantic Oil & Gas Co. located 1 Howard Brooks, elevation 893 ft. These wells are on the Hammersley Fork Quadrangle. In the Tamarack Quadrangle, Mid-Atlantic Oil & Gas Co. located 1 Clara Sandbach, elevation 1,229 ft. and John McGuire located 1 John Gents.

Maryland.—In Garrett County, Maryland, Eberly & Snee are moving in at a new location, the 1 Eli Beechie Nollem Oil & Gas Co. 1 A. D. Nailor, elevation 2,393 ft., is shut down at 3,277 ft. to run casing. The Tully was at 2,696-2,720 ft. and the Onondaga topped at 3,267 ft. Western Maryland Gas Co. 1 George Dawson, elevation 2,451 ft., is also shut down to run the casing. The depth is 3,330 ft. The Tully was found at 2,9 0-2,925 ft., Onondaga 3,360 ft., chert 3,384 ft., gas at 3,389 ft. gaging 622,000 cu. ft.

WEST VIRGINIA SUCCESSFUL WILDCAT

Preston County: Eberly & Snee 1 S. F. Calvert, elev. 2,188 ft., 765 000 cu. ft. of gas, final open flow. Onondaga lime 5,190 ft., chert 5,223 ft., gas 5,260-5,277 ft., Oriskany sand 5,367-5,494 ft.,, show of gas, TD 5,494 ft.

OHIO

COLUMBUS.—Mid East Oil Co. completed a second good producer along the extreme eastern edge of Clayton pool. The 3 H. D. Cannon, Section 11, Clayton Township, Perry County, made 20 bbl. natural and an estimated 100 bbl. in 24 hours after shot. The Clinton sand was logged at 3,415-50 ft.

In the eastern part of New Castle pool in Coshocton County, Mid East 2 Howard Neldon, Section 23, made 9 bbl. natural and 90 bbl. the first day after a 160-qt. shot. A small well was completed in the town of New Castle. Carl Horn et al. 1 Mary Horn, 3rd quarter, made 3 bbl. natural and 30 bbl. in 24 hours after shot.

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THE OIL AND GAS JOURNAL

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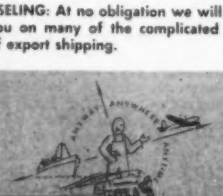

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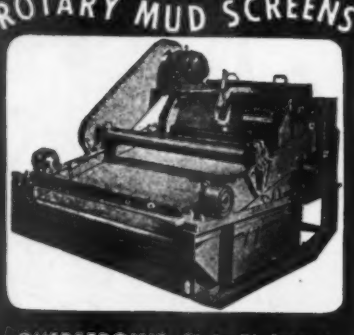

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OHIO WILDCAT FAILURE

Scioto County, Porter Township: Clark Talbot et al. 1 A. W. Hawk, Section 13, Medina 2,094-2,120 ft., TD 2,174 ft.

Illinois-Ind.-Ky.

New Pool Indicated by Illinois Wildcat Test

A PARTICULARLY promising oil discovery appears to have been made in the area about 6 miles northeast of McLeansboro, Hamilton County, Illinois, where a wildcat drilled by Stanford Oil Co. and George Schoonmaker flowed clean oil on a drill-stem test of saturation logged at 3,412-22 ft. in McClosky lime. Casing has been run to 3,417 ft.

The wildcat, 1 Thompson, is located in the SE NW SW 18-4s-7e, and is about a mile south of nearest production at the southeast tip of the Bell Prairie pool.

Another new pool also is indicated in Lawrence County, Illinois, where Cherry-Beebe Drilling Co. 1 Conrad, SE SW NW 9-4n-11w, 5 miles northeast of Lawrenceville, yielded 40 ft. of clean oil and 80 ft. of mud-cut oil on a drill-stem test in the same pay zone at 1,734-38 ft.

Zipp is the name of a new pool opened by Calvert Drilling, Inc., at its 1 Murphy-Colbert, NW NW SW 30-5s-10w, 3 miles north of Evansville, Vanderburgh County, southern Indiana. The well, located west of production of Vanderburgh pool, pumped 20 bbl. of oil per day natural at completion. Production is from a Pennsylvanian sand (Pasadena) at 998-1,006 ft.

ILLINOIS WILDCAT FAILURES

Clark County: Pinkston et al., 1 Cole, NW NE SW 9-10n-14w, junked hole, TD 400 ft.

Clay County: Calvert Drilling, Inc., and W. Duncan 1 Brentberger, NE NE NE 22-5n-6e, dry, TD 2,900 ft.

Edgar County: E. Carl Spicer 1 Waite, NW SE SE 9-12n-13w, dry, TD 623 ft.

Gallatin County: Oil Management, Inc., 1 McGuire, SW SW SE 1-9s-8e, dry, TD 2,452 ft.

Logan County: Rocky Ford Limestone Co. 1 fee, SW SW NW 8-19n-3w, dry, TD 1,856 ft.

INDIANA SUCCESSFUL WILDCATS

Posey County: Calvert Drilling, Inc., 1 Keck heirs, SE NW NE 18-7s-12w, IP 41 bbl., Rosiclare 2,688-96 ft., TD 2,696 ft. (LaMott pool extension).

Vanderburgh County: Calvert Drilling, Inc., 1 Murphy-Colbert, NW NW SW 30-5s-10w, IP 20 bbl., Pasadena 998-1,006 ft., TD 1,010 ft. (discovery well Zipp pool).

INDIANA WILDCAT FAILURES

Clay County: A. R. Thompson 1 Marlow, NW NE SE 18-9n-7w, dry, TD 2,024 ft.

Posey County: Barron Kidd 1 Winterheimer, SW SW SE 22-5s-12w, dry, TD 2,787 ft.

Sullivan County: Lyman Ormiston 1 Whittman, SW SE NE 23-8n-11w, dry, TD 2,785 ft.

Vanderburgh County: Slagter Production Co. 1 Johnson, SE NW NE 34-4s-10w, dry, TD 2,190 ft.

WESTERN KENTUCKY SUCCESSFUL WILDCAT

Daviess County: Simon LeBow 1 Mosley, SE NW NE NE 2-M-30, IP 50 bbl., Tar Springs 946-63½ ft., TD 963½ ft. (discovery well Russell School pool).

WESTERN KENTUCKY WILDCAT FAILURES

Henderson County: Westfall Drilling Co. 1 Staples, NEc SE SE SE 19-P-26, dry, TD 2,222 ft.

Basin Drilling Co. and Ashland Oil & Refining Co. 1 Purgeason, N½ SE SE SW 17-Q-26, dry, TD 2,261 ft.

Ohio County: B. S. Ambrose 1 Hoover, SE NW NE SE 21-M-31, dry, TD 1,203 ft.

Union County: Basin Drilling Co. 1 Stevenson, E½ NE SE SW 5-M-18, dry, TD 2,200 ft.

M. P. Evans 1 Heines, S½ NW SE NW 6-M-18, dry, TD 1,907 ft.

EASTERN KENTUCKY

ASHLAND.—In Morgan County, 14-R-75, and 4 miles northwest of West Liberty, Claude Marshall et al were drilling at 1,167 ft. on the 1 Lewis. This wildcat is 2 miles northeast of the northern end of now abandoned Grassy Creek gas field.

In extreme northern Lee County, 7-N-72, Roy Davis et al have finished their 1 Sherman Bradley dry at a total depth of 1,381 ft. Although a good show of oil and fill-up was recorded, fresh water from up the hole entered the pay and could not be shut off. Operators plan to drill a second test in the near future.

EASTERN KENTUCKY WILDCAT FAILURE

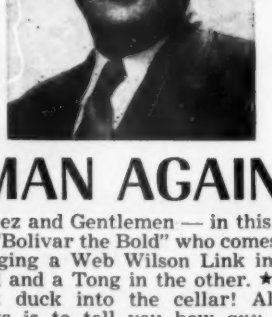
Madison County: Colley Ellis et al 1 State Bank & Trust Co., 11-P-61, dry, TD 2,445 ft., Tyrone 420 ft., St. Peter 953 ft., Knox 1,000 ft., water.

Canadian Fields

Entice Wildcat Has Madison Oil Show

CALGARY.—An encouraging show of oil was obtained this week at an exploratory test being drilled by Socony-Vacuum Exploration Co. in the Entice-Carbon area of southern Alberta. The well is Socony-Entice 1, in LSD 12, 25-28-24w4, about 25 miles southwest of Drumheller oil production and 38 miles northeast of Calgary.

HERE'S THAT



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Initial drill-stem test was run in the Madison limestone section at 5,392-5,405 ft. Valve was open for 1 hour, and pipe recovery was 60 ft. of mud-cut oil. There was no gas flow during the test, and no sign of water. As yet the well is far from being chalked up as an oil discovery, and crew is currently continuing to core and test around 5,415 ft.

A well backed by eight Canadian independents, located ½ mile northwest of the Ellerslie Lower Cretaceous oil discovery well, obtained a small rise of oil during drill-stem test this week. It appears that a commercial well may be obtained at this stepout, but further testing will have to be made. The well is C.P.R.L.-Ellerslie 2, in LSD 3, 6-52-24w4. A 75-minute drill-stem test of Cretaceous interval at 3,886-3,900 ft., gave a maximum natural gas flow rate of 220,000 cu. ft. daily, plus a recovery of 370 ft. of oil and 10 ft. of salt water. A later 1-hour test from 3,900-05 ft. gave a recovery of 1,620 ft. of salt water. Coring ahead is now continuing. The well is a joint operation by P.C.M. Syndicate, Redwater Leaseholds, Ltd., Pacific Petroleums, Ltd., Atlantic Oil Co., Ltd., Calvan Petroleums, Ltd., Chevron Petroleums, Ltd., Goliath Securities, and Lancer Petroleums, Ltd.

Amerada Petroleum Corp. has run string of production casing at its Sunnynook wildcat after electrolog showed signs of gas sands in the Viking, and lower and basal Blairmore formations. No drill-stem tests have been run yet, and it will likely be a week or more before tests will be made to determine potentialities of the zones. Road bans still in effect in Alberta do not permit transport of equipment to or from numerous well sites in the province. The well, Amerada-Crown F41-5, in LSD 16, 5-27-14w4, is located about 9 miles northwest of Cessford gas production, and around 90 miles east-northeast of Calgary. The hole was drilled to 3,716 ft., and string of 5½-in. casing was set at 3,700 ft.

The first oil success on Crown Reserve acreage in the Golden Spike area was indicated this week when a drill-stem test in the Devonian D2 zone at Anglo-Canadian Oil Co. and Calmont Oils, Ltd., initial Golden Spike venture flowed oil. Located 1 mile north of Imperial Oil, Ltd.'s Devonian oil producers, the well also found gas in the Viking, plus gas and some naphtha recovery in the Lower Cretaceous, preliminary to heading to its Devonian objective. The well is Anglo-Calmont-Golden Spike 1, in LSD 11, 34-51-27w4, located on a quarter section of Crown Reserve leased from the Alberta Government for cash bonus of $110,333.66 plus 15 per cent royalty bonus.

The first D2 drill-stem test was run from 5,095-5,120 ft. Oil flowed to the surface in 20 minutes, accompanied by a natural gas flow rate with maximum 500,000 cu. ft. daily. As pipe was being pulled to determine recovery, it partially cleared itself, and the only recovery consisted of 70 ft. of oil and 200 ft. of salt water in the bottom. A second test from 5,120-27 ft., gave a 1-hour pipe recovery of 30 ft. of oil, 50 ft. of oil-cut mud, and 150 ft. of water. The hole is now drilling ahead below 5,222 ft., heading for its D3 Devonian objective.

Permian Basin

Dawson County Oil Discovery Flows From Siluro-Devonian

MIDLAND.—Amerada Petroleum Corp. 1 D. L. Adcock, northeastern Dawson County discovery, reported a flow of 142 bbl. of 41°-gravity oil in 4 hours on a drill-stem test from 10,584-10,647 ft. The pay section has been identified as Siluro-Devonian.

Location of the well is approximately 12 miles northwest of nearest similar production in the one-well Borden field of Borden County, which produces from total depth of 9,933 ft. Top of the Siluro-Devonian was placed at 10,614 ft. in the 1 Adcock, on elevation of 3,002 ft. On the above test, water blanket flowed in 1 hour and 20 minutes and the well was turned into pits for 20 minutes, then turned into tanks. Hourly gages were 41, 37, 29, and 35 bbl. When pipe was pulled there was no water. Core recovery prior to the test indicated 6 ft. of pay between 10,615-621 ft.

George and Frank Frankel, and Shell Oil Co. 1 J. I. Rawls, Irion County Wolfcamp discovery 10 miles south of Mertzon, had flush production following acid treatment through casing perforations at 5,464-94 ft. Flowing through 20/64-in. choke, three hourly gages were 18, 27 and 24.3 bbl., which would give it a daily potential of over 500 bbl. Operators changed choke to 10/64-in. and started potential tests. Location is 1 mile east of a two-well Strawn field in Irion County, and about 2 miles northeast of a Clear Fork producer, which had some production in the Wolfcamp but plugged back for completion.

In the Parks area of Midland County, The Texas Co. 1-B Scharbauer was scheduled for completion attempt from casing perforations at 10,290-325 ft. and open hole at 10,345-10,470 ft. The well had made flows of oil on drill-stem tests of the two sections, in the Pennsylvanian. It is a long northeast extension or new discovery.

In Kent County, Kewanee Oil Co.'s prospective extension to Salt Creek field was having mechanical trouble on tests of the Canyon reef from 6,522-78 ft. Another drill-stem test of the section was to be attempted. Previous tests of the formation from 6,417-6,510 ft. had free oil. The well is Kewanee 1 Sid Oliver in 11-1-H&GN.

Field sources, not yet confirmed, indicate a Spraberry high at James H. Snowden et al 1-34 Schrock, Midland County wildcat 3 miles southeast of Ted Weiner 1-16 Driver, Spraberry discovery. Top of the sand was said to be 7,011 ft., on elevation of 2,719 ft., making it some 107 ft. high to the Driver well, and 230 ft. high to Humble Oil & Refining Co. 1 Midkiff, another Spraberry discovery 7 miles to the west.

The Spraberry top is also 184 ft. high to Magnolia's 1 Preston, which was last reported coring ahead in the Spraberry. The 1 Preston flowed 38 bbl. of new oil in 1½ hours through ⅜-in. choke, from perforations between 7,098-7,202 ft.

The 1-34 Schrock had total depth at 7,012 ft. and was waiting on cement after running casing to 7,011 ft.

Kewanee Oil Co. 1-E Connell, Kent County wildcat about 1 mile southwest of nearest production in East Polar-Pennsylvanian field, recovered 90 ft. of free oil, 135 ft. of oil and gas-cut mud and 450 ft. of salt water on a test in the Pennsylvanian at 7,085-7,108 ft. Operators were to drill ahead and retreat.

WEST TEXAS (DISTRICTS 8 AND 7-C) SUCCESSFUL WILDCATS

Cochran County: Blackwood & Nichols Co. 1 Dean, Lipscomb CSL, Lge. 91, 12½ mi. SW Whiteface, TD 5,038 ft., pay 5,012 ft., IP pumped 338 bbl. 32°-gravity oil a day.

Crockett County: C. S. Jones 1 University, 36-30-University Lands, 16 mi. NW Ozona, TD 1,180 ft., pay 1,079 ft., IP 6,000,000 cu. ft. gas.

Pecos County: Callery & Hurt, Inc. 1-A H. J. Eaton, 27-3-H&TC, TD 8,061 ft., PB 5,515 ft., elev. 2,461 ft., Silurian (?) pay 5,328 ft., IP 153.6 bbl. 75°-gravity distillate and 22,000,000 cu. ft. gas a day.

Sutton County: C. L. Norsworthy, Jr. and Lone Star Producing Co. 4 Thomson, 67-A-HE&WT, 8½ mi. N Sonora, TD 740 ft., IP pumped 69 bbl. 35°-gravity oil a day.

Ward County: Merrill-Voiles-Tullous 1 Atlantic-J. S. Reynolds, 19-34-H&TC, TD 2,427 ft., pay 2,404 ft., IP pumped 132 bbl. 36°-gravity oil a day.

WEST TEXAS (DISTRICTS 8 AND 7-C) WILDCAT FAILURES

Ector County: Vina Bagley Estate 1 J. E. Cowden, 48-42-3S-T&P, dry, TD 14,038 ft., elev. 2,937 ft., Wolfcamp 9,190 ft., Pennsylvanian 10,342 ft., Devonian 12,220 ft., Silurian 13,080 ft., Fusselman 13,145 ft., Montoya 13,230 ft., Ellenburger 14,016 ft.

Garza County: Fred W. Shield 1 L. G. Thuett, 1315-1-H&OB, dry, TD 3,780 ft., elev. 2,915 ft., San Andres 3,005 ft.

Glasscock County: Ralph Lowe 1 Neal Ballinger, 16-33-3S-T&P, dry, TD 10,336 ft., elev. 2,719 ft., Strawn 9,490 ft., Silurian 10,080 ft., Ellenburger 10,290 ft.

Irion County: John Fidel 1 Jim Nutt, Gonzales CSL, 4 mi. SE Mertzon, dry, TD 1,460 ft.

Lynn County: Magnolia Petroleum Co. 1 W. W. Caswell, 431-9-EL&RR, dry, TD 9,360 ft., elev. 2,920 ft., Spraberry 5,943 ft., Pennsylvanian 8,480 ft., reef 8,674 ft., Mississippian 9,010 ft.

Terry County: Humble Oil & Refining Co. 1 G. F. Bell, 3-C37-PSL, dry, TD 12,120 ft., elev. 3,224 ft., Spraberry 7,471 ft., Wolfcamp 9,273 ft., Pennsylvanian 9,750 ft., Canyon 9,835 ft., Strawn 10,275 ft., Mississippian 11,500 ft., Woodford 11,960 ft., Devonian 12,044 ft.

Yoakum County: James D. Erwin 1 Tannehill Estate, 776-D-J. H. Gibson Sur., dry.

(Continued on page 161)

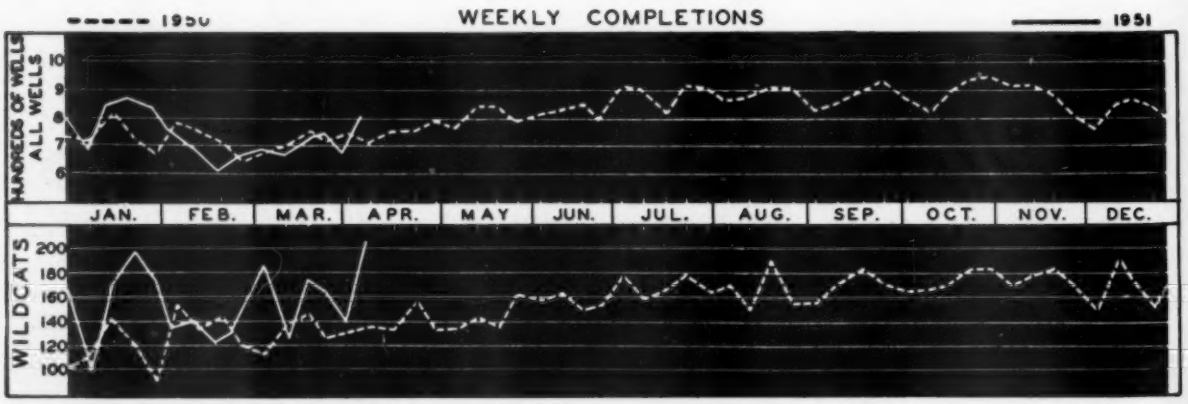
CURRENT STATISTICS

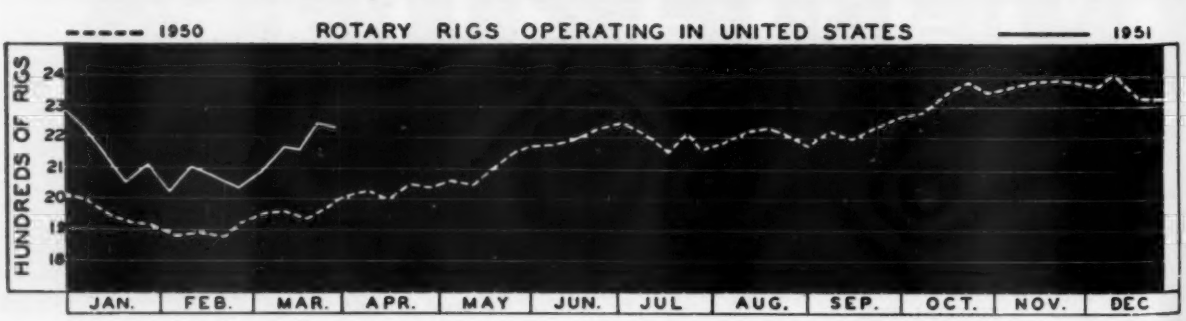
EXPLORATION

WEEKLY WELL COMPLETIONS . . . . . WEEK ENDED APRIL 7, 1951

	Total of all wells					Apr. 7		Wildcat completions and discoveries					Cumulative total, 1951				
	Comp.	Oil	Gas	Dry	Footage	1951	1950	Oil	Dist.	Gas	Dry	Total	Oil	Dist.	Gas	Dry	Total
New York	6	3	0	*3	8,786	103	155	0	0	0	0	0	0	0	0	0	0
Pennsylvania	19	7	4	†8	34,462	215	284	0	0	0	0	0	0	0	0	1	1
West Virginia	10	1	6	3	33,941	158	166	0	0	1	0	1	0	0	4	2	6
Ohio	15	5	4	6	31,882	214	242	0	0	1	1	2	1	0	3	9	13
Indiana	15	5	0	10	31,394	235	276	2	0	0	4	6	8	0	1	52	61
Kentucky	15	6	0	9	22,213	203	214	1	0	0	6	7	3	0	0	32	35
Illinois	19	7	0	12	36,254	416	550	0	0	0	5	5	11	0	0	65	76
Michigan	19	5	1	13	43,706	182	188	0	0	0	8	8	3	0	3	71	77
Kansas	74	40	3	31	256,435	1,055	896	2	0	0	19	21	46	0	3	190	239
Nebraska	5	2	0	3	18,657	80	18	0	0	0	2	2	2	0	1	34	37
Oklahoma	124	61	10	*53	389,517	1,426	1,323	5	0	0	16	21	54	1	7	180	242
Texas	365	236	9	120	1,627,562	4,270	4,122	18	2	5	72	97	173	19	31	773	996
North Central (Dist. 7-B & 9)	115	52	3	60	378,865	1,267	1,285	10	0	2	33	45	84	0	5	307	396
West (Dist. 7-C & 8)	136	114	1	21	700,380	1,315	1,193	3	1	1	8	13	34	5	1	154	194
Panhandle (Dist. 10)	9	6	0	3	28,632	188	290	0	0	0	2	2	0	0	0	8	8
Eastern (Dist. 5, 6, & 6-P)	30	18	0	12	132,141	292	283	0	1	0	12	13	0	1	0	63	64
Gulf Coast (Dist. 2 & 3)	34	21	5	8	203,273	605	555	2	0	2	5	9	31	9	20	112	172
Southwest (Dist. 1 & 4)	41	25	0	16	184,271	603	516	3	0	0	12	15	24	4	5	129	162
Louisiana	29	17	4	8	222,250	529	635	0	0	0	4	4	16	0	3	71	90
Northern	12	6	2	4	42,536	252	327	0	0	0	3	3	4	0	2	36	42
Southern	17	11	2	4	179,714	277	308	0	0	0	1	1	12	0	1	35	48
Arkansas	10	6	0	4	41,707	102	95	1	0	0	1	2	2	0	1	15	18
Mississippi	8	4	0	4	58,224	64	85	1	1	0	3	5	4	2	0	26	32
Southeastern States	1	1	0	0	3,391	14	18	0	0	0	0	0	0	0	0	2	2
Montana	12	2	0	10	25,251	50	30	0	0	0	9	9	0	0	0	16	16
Wyoming	16	10	0	6	87,656	182	144	0	0	0	4	4	4	0	0	28	32
Colorado-Utah	3	2	0	1	14,594	62	18	0	0	0	1	1	2	0	1	32	35
New Mexico	1	0	0	1	3,357	174	184	0	0	0	0	0	4	0	5	18	27
California	44	30	1	13	169,927	525	450	2	0	0	10	12	13	0	1	106	120
Miscellaneous	0	0	0	0	0	11	3	0	0	0	0	0	0	0	6	5	11
Total United States	810	450	42	318	3,161,166	10,270	10,096	32	3	7	165	207	346	22	70	1,728	2,166
Total previous week	673	367	49	257	2,545,221	....	....	26	1	5	108	140	314	19	63	1,563	1,959
Total April 7, 1950	718	415	45	258	2,622,607	....	....	19	0	6	111	136	252	19	61	1,481	1,813

Service wells included: *3, †7.





DAILY AVERAGE PRODUCTION FOR WEEK

	Apr. 7 crude oil	B. of M. Apr. demand	Mar. 31 crude oil
Alabama	2,750	2,400	2,700
Arkansas	79,150	86,000	79,100
California	965,600	970,000	965,900
Colorado	78,500	79,000	79,300
Eastern	59,000	66,000	58,050
Florida	1,625	1,600	1,500
Illinois	157,500	166,000	165,400
Indiana	29,600	31,000	27,200
Kansas	311,950	308,000	322,900
Kentucky	28,000	31,000	28,600
Louisiana	609,275	632,000	610,200
North Louisiana	114,350	.....	114,200
South Louisiana	494,925	.....	496,000
Michigan	39,300	45,000	41,200
Mississippi	97,550	112,000	98,500
Montana	24,200	24,000	24,500
Nebraska	10,100	10,000	10,100
New Mexico	143,850	142,000	141,000
Oklahoma	492,000	506,000	494,600
Texas	2,725,375	2,500,000	2,616,550
Dist. 1 (Southwest)	33,525	.....	32,975
Dist. 4 (Southwest)	254,650	.....	244,150
Dist. 2 (Gulf Coast)	162,325	.....	157,100
Dist. 3 (Gulf Coast)	481,825	.....	463,900
Dist. 5 (Eastern)	51,475	.....	48,650
Dist. 6 (Eastern)	111,575	.....	105,725
East Texas field	279,000	.....	271,000
Dist. 7-C (West)	91,725	.....	84,950
Dist. 8 (West)	935,900	.....	892,500
Dist. 7-B (W. Central)	83,425	.....	79,200
Dist. 9 (N. Central)	150,250	.....	147,400
Dist. 10 (Panhandle)	89,700	.....	89,000
Utah	3,800	5,000	3,700
Wyoming	197,500	183,000	197,200
Total United States	*6,056,625	5,900,000	5,968,300
Change from previous week, up	88,325		
Canada	49,075	.....	74,980

Total U. S. production January 1-April 7 ..... †588,269,325 bbl.
Same period last year (crude plus cond.) ..... 479,242,910 bbl.

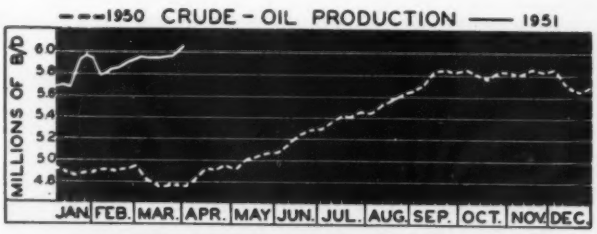
*Not including 109,305 bbl. condensate. †Including 10,314,570 bbl. condensate.

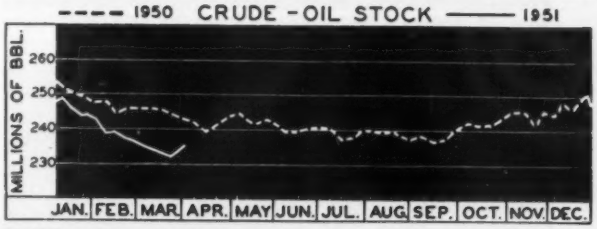
CRUDE-OIL STOCKS BY STATES OF ORIGIN*

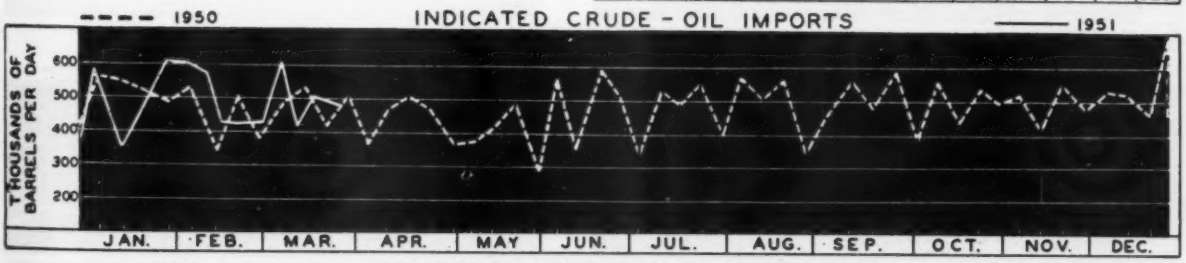
(Thousands of barrels)

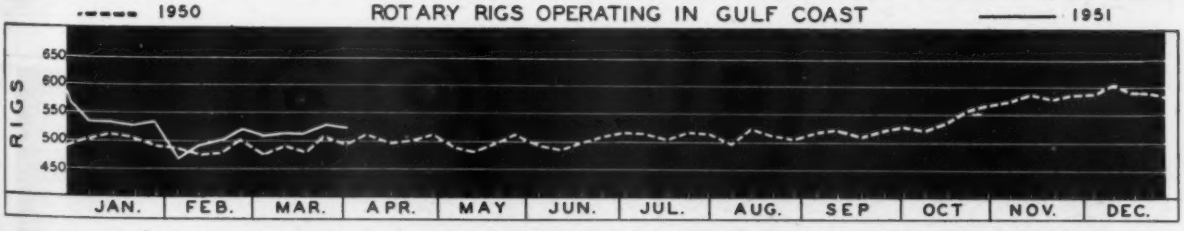
	Mar. 31, 1951	Mar. 24, 1951	Apr. 1, 1950
Pennsylvania Grade	2,058	2,030	2,804
Other Appalachian	1,333	1,092	1,591
Illinois, Indiana, Michigan	8,722	8,624	10,205
Arkansas	2,802	2,743	3,368
Louisiana	14,124	13,888	15,992
North	2,748	2,938	3,454
Gulf	11,376	10,950	12,538
Mississippi	2,831	2,788	2,566
New Mexico	7,259	7,037	6,628
Oklahoma and Kansas	37,260	37,081	35,310
Texas	110,331	109,303	107,016
East Texas	14,333	13,962	14,598
West Texas	41,899	44,155	37,876
Texas Gulf	23,947	23,509	28,219
Other Texas	27,152	27,682	26,323
Rocky Mountain	12,636	12,314	13,308
California	30,234	29,503	38,245
Foreign	6,316	6,374	6,074
Total	235,956	232,832	243,107

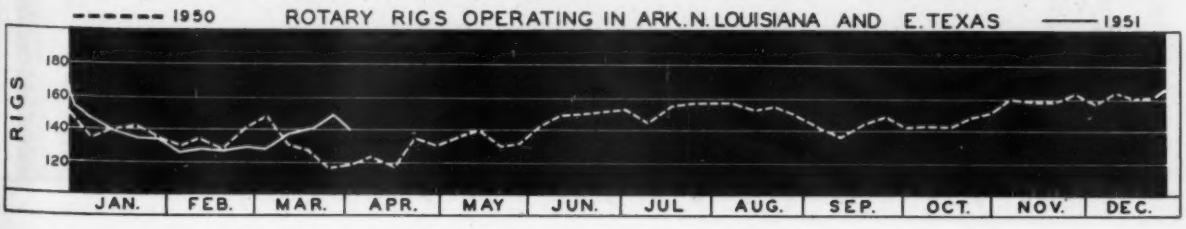
*Bureau of Mines.









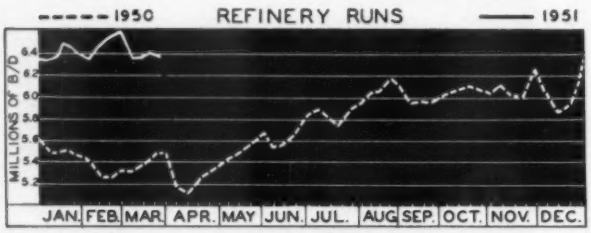

------ 1950 ROTARY RIGS OPERATING IN ARK.N.LOUISIANA AND E.TEXAS —— 1951
RIGS
180
160
140
120
JAN. FEB. MAR. APR. MAY JUN. JUL AUG. SEP. OCT. NOV. DEC.

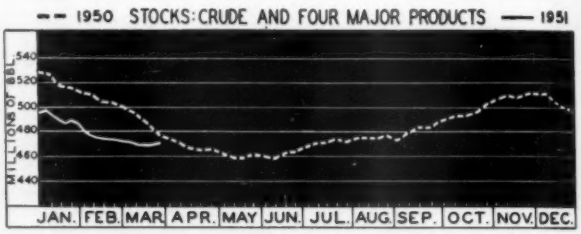
A.P.I. REFINERY REPORT, MARCH 31

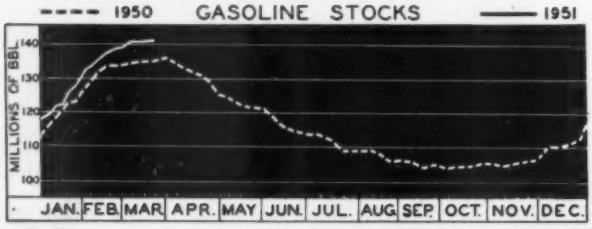
(Thousands of barrels)

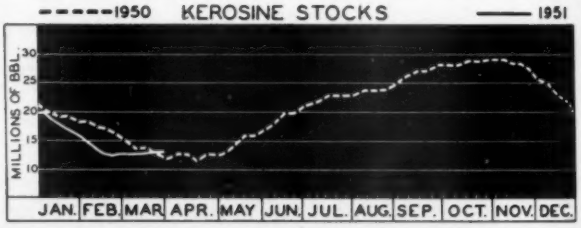
District—	Daily avg. crude runs	Daily average production				Stocks at refineries, bulk terminals, in transit and in pipe lines				Bureau of Mines, March 1950				
		Gasoline*	Kerosine	Distillate	Residual	Gasoline†	Kerosine	Distillate	Residual	Daily avg. crude runs	Daily average production: Gasoline*	Kerosine	Distillate	Residual
East Coast	1,038	351.7	50.4	256.0	219.1	27,775	5,523	12,306	8,187	810	330.6	30.2	182.6	204.3
Appalachian:														
District 1	104	43.1	6.4	13.4	13.0	2,936	244	471	267	91	40.1	7.6	13.3	10.4
District 2	69	29.7	4.6	6.7	20.9	1,431	70	151	131	69	29.9	4.5	11.3	18.3
Ind., Ill., Ky.	1,226	587.6	73.6	224.4	181.7	32,685	2,501	7,018	2,939	1,032	526.8	67.4	169.2	191.9
Okla., Kans., Mo.	482	260.3	15.9	118.9	77.7	16,005	589	5,324	1,030	426	235.8	18.2	89.4	54.4
Inland Texas	226	134.3	14.6	39.4	45.4	3,987	258	557	740	199	141.2	11.0	26.7	44.1
Texas Gulf Coast	1,580	714.6	146.1	362.9	277.0	23,186	1,780	5,515	4,311	1,234	579.0	102.6	209.4	216.9
La. Gulf Coast	473	244.9	59.0	111.3	66.3	8,163	1,227	2,326	1,688	431	209.3	56.6	92.7	50.3
N. La. and Ark.	81	29.7	8.7	21.0	8.7	2,710	163	634	74	64	25.8	6.8	12.8	13.6
Rocky Mountain:														
New Mexico	14	7.6	.....	2.9	2.9	89	25	61	33	12	6.3	0.4	1.9	2.9
Other Rocky Mtn.	216	101.7	8.1	37.9	45.4	5,675	273	1,291	702	170	79.5	6.1	32.0	35.7
California	872	408.8	16.6	143.1	348.6	17,544	632	7,516	17,180	798	334.5	14.4	96.4	311.0
March 31, 1951	6,381	2,914.0	404.0	1,337.9	1,306.7	142,186	13,285	43,170	37,282	5,336	2,538.8	325.8	937.7	1,153.8
March 24, 1951	‡6,380	2,861.1	374.1	1,278.7	1,388.6	141,239	13,032	43,626	37,327	.....	.....	.....	.....	.....
April 1, 1950	5,470	2,633.1	328.7	928.7	1,131.7	135,586	12,425	38,532	41,041	.....	.....	.....	.....	.....

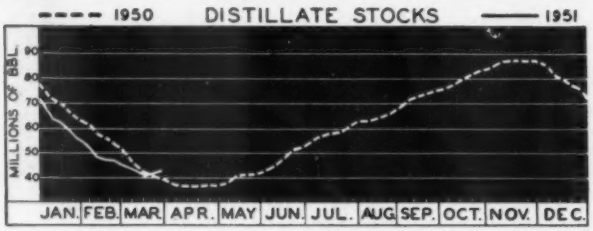
*At refineries including natural blended. †Finished and unfinished. ‡Revised.

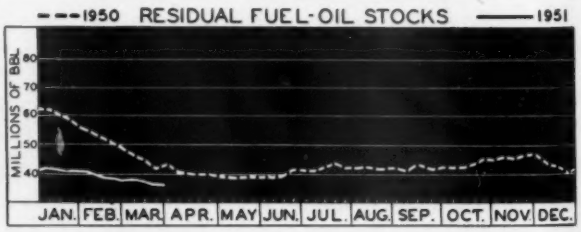


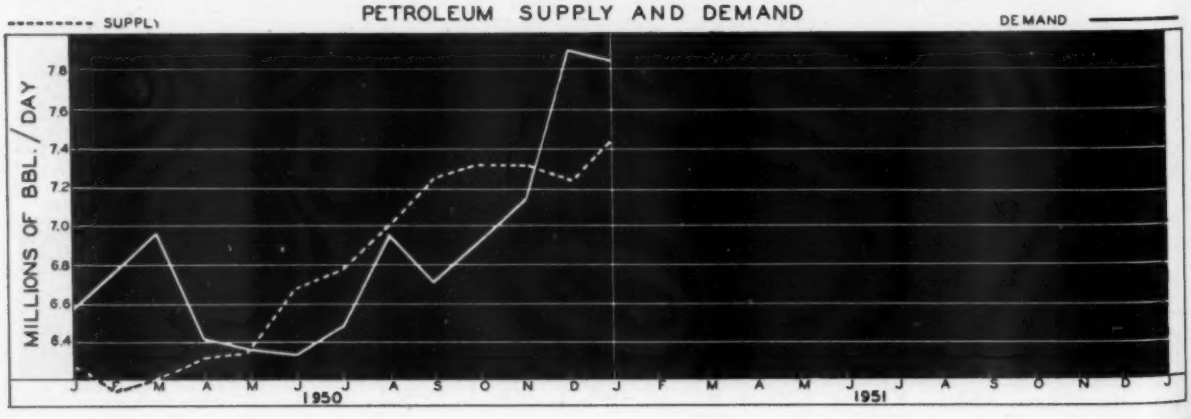












CRUDE PRICES GRAVITY SCHEDULE

	Signal Hill, Calif.‡	Oklahoma, Kansas	Gulf Coast Tex.*	West Tex.†
18-18.9	$1.93	....	....	....
19-19.9	1.98	....	....	....
20-20.9	2.03	$2.25	....	$2.12
21-21.9	2.07	2.27	....	2.14
22-22.9	2.12	2.29	....	2.16
23-23.9	2.18	2.31	....	2.18
24-24.9	2.24	2.33	$2.56	2.20
25-25.9	2.30	2.35	2.58	2.22
26-26.9	2.36	2.37	2.60	2.24
27-27.9	2.41	2.39	2.62	2.26
28-28.9	2.46	2.41	2.64	2.28
29-29.9	2.52	2.43	2.66	2.30
30-30.9	2.57	2.45	2.68	2.32
31-31.9	2.62	2.47	2.70	2.34
32-32.9	2.68	2.49	2.72	2.36
33-33.9	....	2.51	2.74	2.33
34-34.9	....	2.53	2.76	2.40
35-35.9	....	2.55	2.78	2.42
36-36.9	....	2.57	2.80	2.44
37-37.9	....	2.59	2.82	2.46
38-38.9	....	2.61	2.84	2.48
39-39.9	....	2.63	2.86	2.50
40 and above	....	2.65	2.88	2.52

*For crude from Daboval, El Campo, and Sand Point.

†Includes Lea County, New Mexico. Last general price change represented a 50-cent increase becoming effective December 6, 1947.

‡Standard Oil Co. of California.

FLAT CRUDE PRICES

Representative posted schedules per barrel.

East Texas†	$2.65
Kettleman Hills, California*	2.80
Beauregard Parish	2.60
Illinois Basin	2.77
Pecos County, Texas (Yates)	2.35
Bradford, Pennsylvania	4.25
Eastern Ill. and Western Ind.†	2.77
Tomball, Texas Gulf Coast	2.83

*37°-37.9°. †35° and above.

CONTINUED pressure on natural-gasoline prices resulted in two price reductions for the week ended April 7. On April 3, the Group 3 price for 26-70 natural dropped .5 cent to 5.875 cents a gallon. Another reduction of .375 cent on April 6 brought the posting down to 5.5 cents.

The latest cuts have come later in the season than in the general pattern of price fluctuations in the natural market for the past few years. The low point for 1949 was reached in the second week of March when the Group 3 price for 26-70 natural went to 5 cents. The 1950 low of 4 cents a gallon came in the first week of March of that year. The total of all cuts in early 1949 amounted to a reduction of 3.5 cents a gallon from the 8.5-cent level that held throughout 1948. The gain of .875 cent in the later months of 1949 was followed by a series of cuts early in 1950 amounting to 1.875 cents.

By the end of 1950, the price had climbed back to 6.875 cents with the last .5-cent raise coming just after the middle of December. This price held until February 12, 1951, when postings were reduced to 6.375 cents. The market has been under pressure, particularly in Texas, for the past few weeks. Seasonal gasoline sales are running about 2 weeks later than last year, and the reduced supply of tetraethyl lead has caused some shift from natural to other light materials with higher octane values. However, most marketers feel that the natural market will improve under the impact of record motor-fuel demands.

Primary inventories of the four major products, located east of California, were about 18,000,000 bbl. greater at the end of March than at the same time last year. At the end of January, comparable inventories were almost 900,000 bbl. less than a year earlier. High runs for the past 2 months have held product stock withdrawals to a minimum.

REPRESENTATIVE QUOTATIONS

Representative spot-market quotations of leading suppliers as of April 9, 1951. Figures are f.o.b. plant for tank-car shipments in cents per gallon, except for residual fuel oil which shows the price per barrel and wax, in cents per pound.

GASOLINE, KEROSINE, AND FUEL OILS

	Mid-Continent Group 3	New York Harbor (barge	Texas Gulf Coast
Regular gasoline, 80-82 octane	10⅛-10½	12-12.75	10¾-11
Premium gasoline, 86-88 octane	11⅛-11½	13.5-13.75	11½-12
42-44 w.w. kerosine	9¼-9⅜	10-10.1	8¾-9
No. 2 straw fuel oil	8¼-8⅜	9-9.25	7¾-8
No 6 residual	$1.80-1.90	$2.25-2.30	$1.75-1.90

NATURAL GASOLINE

	Group 3	North Texas	N. La.
Grade 26-70	5½	5	5¼
Grade 18-55	6.6	6.1	6.35

LUBRICATING OILS

South Texas

200 vis., No. 2-3 neutral	13-13.5
750 vis., No. 3-4 neutral	16
2,000 No. 5-6 neutral	18-19

LUBRICATING OILS

Mid-Continent

150-160 vis., D bright stock, 0-10 pp.	29-30
200 vis., No. 3 neutral, 0-10 pp.	17.5-18.5

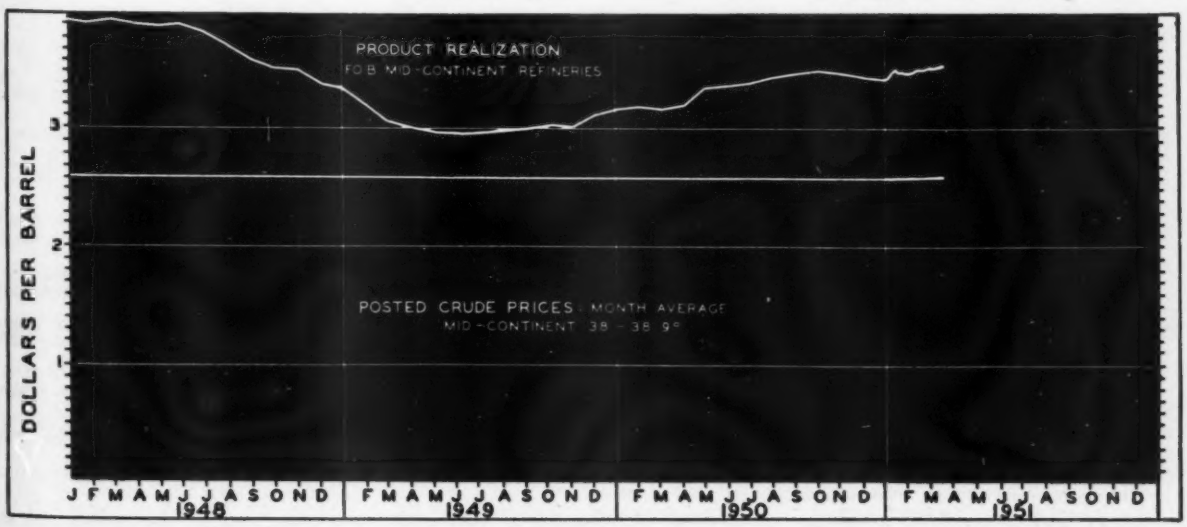
Western Pennsylvania

145-155 vis., 10 p.t. bright stock	32.5
180 vis., 0 p.t. neutral	31.5

WAX

Mid-Continent

132-134 A.M.P.	6.0


PRODUCT REALIZATION
F.O.B. MID-CONTINENT REFINERIES
POSTED CRUDE PRICES - MONTH AVERAGE
MID-CONTINENT 38 - 38.9°
DOLLARS PER BARREL
3
2
1
J F M A M J J A S O N D
1948
F M A M J J A S O N D
1949
F M A M J J A S O N D
1950
F M A M J J A S O N D
1951

In this trend chart refinery realization is based on average Mid-Continent grade crude oil (not 38° gravity only) and average prices for refinery products as published in The Oil and Gas Journal basis Oklahoma (Group 3). Refinery yields confined to gasoline, kerosine, distillate, and fuel oil. Realization averaged $3.55 for week ended March 31, $3.54 for previous week, and $3.22 for March 1950.

Oklahoma Fields

(Continued from page 138)

erboard 3,228 ft., Big lime 3,673 ft., Oswego 3,714 ft., Cherokee 3,817 ft., Verdigris 3,875 ft., upper Skinner 3,880 ft., elev. 920 ft.

Major County: Mazda Oil Corp. 1 Wolf, NE SE NE 26-22n-10w, flowed 155 bbl. of oil per day from Manning at 6,748-84 ft., TD 6,825 ft., elev. 1,324 ft.

Pawnee County: Randall Drilling 1 Shelton, NW SW SW 18-20n-9e, flowed 75 bbl. of oil per day from Red Fork at 2,266-2,309 ft., TD; Layton 1,130 ft., conglomerate 1,470 ft., Peru 2,023 ft., lime 2,189 ft., elev. 771 ft.

OKLAHOMA WILDCAT FAILURES

Cotton County: C. J. Westlund and Kingery Drilling 1 Wallace, NW SW SW 11-2s-12w, dry, TD 2,006 ft., Megargel 1,943 ft., shaly sand 1,985 ft.

Creek County: Faultline Oil Corp. 1 Washington, SW NE SE 22-14n-9e, dry, TD 707 ft., sand 650 ft., elev. 856 ft.

Garfield County: Bay & Cassel 1 Webber, NW NE NW 28-20n-4w, dry, TD 4,808 ft., Oread 3,522 ft., Tonkawa 3,728 ft., upper Layton 4,625 ft., lower Layton 4,732 ft., elev. 1,084 ft.

Kay County: Aurora Gasoline 1 Kucera, NE NE NE 18-28n-2e, dry, TD 3,683 ft., Layton 2,830 ft., Checkerboard 3,116 ft., Big lime 3,236 ft., Oswego 3,274 ft., Cherokee 3,400 ft., Verdigris 3,452 ft., Skinner 3,502 ft., lime 3,524 ft., Mississippi lime 3,652 ft., elev. 1,136 ft.

Kiowa County: McWhirter 1 Tyson, NE NW SE 34-6n-20w, dry, TD 500 ft., granite wash 425 ft.

Lincoln County: Falcon-Seaboard Drilling 1 Carter, NE NE SE 7-13n-3e, dry, TD 5,388 ft., Pawhuska 1,545 ft., Elgin 1,605 ft., Avant 3,010 ft., Belle City 3,110 ft., Hogshooter 3,340 ft., Layton 3,380 ft., Checkerboard 3,720 ft., conglomerate 3,732 ft., Oswego 4,330 ft., Cherokee 4,370 ft., Prue 4,385 ft., Verdigris 4,395 ft., lime 4,865 ft., Mayes 4,910 ft., Woodford 5,002 ft., Hunton 5,071 ft., Sylvan 5,115 ft., Viola 5,204 ft., dense 5,252 ft., dolomite 5,265 ft., Wilcox 5,310 ft., second Wilcox 5,378 ft., elev. 1,008 ft.

Logan County: Mizel Bros. 1 Stewart, NW NW SE 20-15n-1e, dry, TD 5,782 ft., Hogshooter 3,985 ft., Layton 4,028 ft., Checkerboard 4,075 ft., oolitic lime 4,268 ft., Big lime 4,665 ft., upper Oswego 4,755 ft., Prue 4,855 ft., Verdigris 4,925 ft., lime 5,050 ft., Mississippi lime 5,159 ft., Woodford 5,245 ft., Hunton 5,320 ft., Sylvan 5,400 ft., Viola 5,495 ft., dolomite 5,565 ft., Wilcox 5,630 ft., second Wilcox 5,750 ft., elev. 1,011 ft.

Noble County: Dirickson-Lewis Drilling 1 Ebersole, SE NW NW 11-21n-1w, dry, TD 3,693 ft., Lovell lime 2,857 ft., upper Tonkawa 2,980 ft., lower Tonkawa 3,070 ft., Avant 3,173 ft., Perry 3,353 ft., Osage Layton 3,631 ft., elev. 1,013 ft.

Osage County: The Texas Co. 1 Osage, NW NW SE 19-24n-4e, dry, TD 3,886 ft., Pawhuska 1,062 ft., Tonkawa 1,810 ft., Avant 2,021 ft., Hogshooter 2,513 ft., Layton 2,750 ft., Checkerboard 2,785 ft., conglomerate 2,827 ft., Oswego 2,966 ft., Prue 3,180 ft., Skinner 3,258 ft., Red Fork 3,314 ft., Bartlesville 3,353 ft., Mississippi chat 3,440 ft., Mississippi lime 3,522 ft., Woodford 3,770 ft., Misener 3,782 ft., dolomite 3,790 ft., second Wilcox 3,801 ft., elev. 886 ft.

Pawnee County: Big Four Petroleum and Aurora Gasoline 1 Hurst, NW NW NE 3-20n-5e, dry, TD 3,599 ft., Big lime 2,992 ft., Oswego 3,092 ft., Prue 3,182 ft., lime 3,368 ft., Red Fork 3,398 ft., Mississippi lime 3,597 ft., elev. 1,103 ft.

R. C. Davis 1 School Land, SW SW SE 36-22n-6e, dry, TD 3,203 ft., Avant 1,395 ft., Hogshooter 1,683 ft., Layton 1,711 ft., Checkerboard 1,979 ft., conglomerate 1,989 ft., Big lime 2,243 ft., Oswego 2,345 ft., Prue 2,411 ft., Verdigris 2,468 ft., Skinner 2,515 ft., lime 2,577 ft., Mississippi lime 2,779 ft., Woodford 2,913 ft., Wilcox 2,936 ft., Arbuckle 3,184 ft., elev. 830 ft.

Pontotoc County: Holshauser 1 Cowden, NW NW NE 16-4n-5e, dry, TD 1,429 ft., sand 942 ft. and 1,045 ft., Wewoka 1,190 ft., Calvin 1,350 ft., elev. 1,059 ft.

Stephens County: C. L. Carlock 1 City of Comanche, NW NE NW 13-2s-7w, dry, TD 3,801 ft., sand 1,436 ft., 1,622 ft., 1,864 ft., 1,919 ft., 1,970 ft., 2,078 ft., 2,224 ft., and 2,286 ft., broken sand 2,548 ft. and 2,878 ft., detrital lime 3,596 ft., elev. 1,067 ft.

Athinson and Ockershauser 1 Butts, NE NE SW 2-3s-6w, dry, TD 2,542 ft., Loco lime 1,423 ft., Canyon 2,330 ft., Simpson 2,476 ft., elev. 980 ft.

T. W. Fentem, Jr., 1 Massey, NW SE NE 3-3s-7w, dry, TD 1,005 ft., sand 938 ft., 944 ft., and 968 ft., elev. 997 ft.

Horowitz et al 1 Billingsley, NE NE NE 31-2n-4w, dry, TD 6,590 ft., sand 1,302 ft., 1,366 ft., and 1,386 ft., shale 4,690 ft., broken sand 5,064 ft., 5,103 ft., 5,194 ft., 5,232 ft., 5,336 ft., 5,430 ft., 5,510 ft., 5,570 ft., 5,622 ft., 5,749 ft., 5,816 ft., and 5,886 ft., sand 5,985 ft., 6,268 ft., 6,312 ft. and 6,360 ft., elev. 1,174 ft.

Kansas Fields

(Continued from page 138)

Heebner 3,108 ft., lime 3,219 ft., Lansing-Kansas City 3,232 ft., shaly Sooy 3,479 ft., cherty Sooy 3,504 ft., Arbuckle 3,540 ft., elev. 1,858 ft.

Ellis County: Herndon 1 Davis, SW SW SW 24-11s-20w, dry, TD 3,774 ft., Heebner 3,358 ft., Lansing-Kansas City 3,396 ft., Simpson 3,709 ft., Arbuckle 3,725 ft., elev. 2,105 ft.

Rine 1 Schmidt, SW SW SW 26-12s-18w, dry, TD 3,720 ft., Topeka 3,098 ft., Heebner 3,357 ft., Lansing-Kansas City 3,405 ft., Sooy 3,672 ft.

Darby-Bothwell 1 Rome, SE SE SW 23-13s-17w, dry, TD 3,566 ft., anhydrite 1,178 (?) ft., Topeka 2,910 (?) ft., Heebner 3,220 ft., Lansing-Kansas City 3,266 ft., Sooy 3,511 ft., elev. 1,976 ft.

Graham County: Peel-Hardman and Derby 1 Kobler, NW NW NW 26-8s-24w, dry, TD 4,256 ft., anhydrite 2,065 ft., Topeka 3,401 ft., Heebner 3,577 ft., Lansing-Kansas City 3,614 ft., Mississippi lime 4,163 ft., Arbuckle 4,217 ft., elev. 2,352 ft.

Greenwood County: Cox-Burns et al 1 Carson, NW SE NW 4-24s-11e, dry, TD 2,449 ft., Mississippi lime 1,990 ft., Kinderhook 2,397 ft., Arbuckle 2,444 ft.

Hodgeman County: Jones-Shelburne & Farmer 1 Goebel, SW SW SW 31-20s-23w, dry, TD 4,725 ft., Topeka 3,610 ft., Heebner 3,975 ft., Toronto 4,006 ft., Lansing-Kansas City 4,038 ft., Sooy 4,640 ft., Mississippi lime 4,673 ft., elev. 2,407 ft.

Marshall County: Ohio 1 Kratochvil, SE SE SW 30-5s-7e, dry, TD 2,526 ft., Howard 953 ft., Topeka 1,000 ft., Oread 1,131 ft., Lansing-Kansas City 1,232 ft., Hunton 1,676 ft., Viola 2,199 ft., Simpson 2,390 ft., St. Peter 2,440 ft., pre-Cambrian 2,496 ft., elev. 1,407 ft.

Pawnee County: Honaker 1 Houser, SW SW NW 31-21s-15w, dry, TD 3,955 ft., anhydrite 940 ft., Heebner 3,362 ft., Lansing-Kansas City 3,482 ft., Viola 3,791 ft., Simpson 3,944 ft., Arbuckle 3,899 ft., elev. 1,973 ft.

Phillips County: Bay Petroleum 1 Schluntz, NE SW SE 23-1s-17w, dry, TD 3,648 ft., Heebner 3,352 ft., Dodge 3,385 ft., Lansing-Kansas City 3,403 ft., base Kansas City 2,646 ft., elev. 2,116 ft.

Rice County: Dozier 1 Schroeder, NE NE NE 10-18s-9w, dry, TD 3,336 ft., anhydrite 424 ft., Topeka 2,476 ft., Heebner 2,748 ft., lime 2,870 ft., Lansing-Kansas City 2,891 ft., Sooy 3,213 ft., Simpson 3,253 ft., Arbuckle 3,286 ft., elev. 1,748 ft.

Anschultz 1 Colahan, SW NW SW 35-18s-10w, dry, TD 3,310 ft., anhydrite 435 ft., Heebner 2,792 ft., lime 2,912 ft., Lansing-Kansas City 2,930 ft., Arbuckle 3,285 ft., elev. 1,731 ft.

National Associated 1 Guthrie, SE SE NE 20-19s-6w, dry, TD 3,590 ft., Fort Riley 1,120 ft., Wreford 1,310 ft., Topeka 2,262 ft.,, Heebner 2,538 ft., Lansing-Kansas City 2,706 ft., Sooy 3,158 ft., Mississippi lime 3,170 ft., Kinderhook 3,205 ft., Misener 3,402 ft., Maquoketa 3,438 ft., Viola 3,460 ft., Simpson 3,494 ft., Arbuckle 3,561 ft., elev. 1,571 ft.

Scott County: Peel-Hardman 1 Taylor, SW SW SW 20-18s-31w, dry, TD 4,580 ft., Lansing-Kansas City 3,902 ft., elev. 2,969 ft.

Stafford County: Todd 1 Ira, SE SE NW 13-21s-11w, dry, TD 3,456 ft., Heebner 2,916 ft., lime 3,048 ft., Lansing-Kansas City 3,066 ft., Sooy 3,343 ft., Viola 3,362 ft., Simpson shale 3,391 ft., Arbuckle 3,431 ft., elev. 1,726 ft.

Imperial 1 Ward, NE NE SE 15-23s-13w, dry, TD 3,921 ft., Heebner 3,284 ft., lime 3,420 ft., Lansing-Kansas City 3,443 ft., Viola 3,752 ft., Simpson 3,832 ft., Arbuckle 3,888 ft., lev. 1,880 ft.

Lindas 1 Radke, NW NW SW 26-23s-14w, dry, TD 3,179 ft., anhydrite 880 ft., Heebner 3,465 ft., Lansing-Kansas City 3,620 ft., Sooy 3,991 ft., Viola 4,009 ft., Simpson 4,073 ft., Arbuckle 4,139 ft., elev. 1,946 ft.

EASTERN NEBRASKA WILDCAT FAILURE

Richardson County: Stout 1 Davenport, NW NW NE 34-2n-16e, dry, TD 2,420 ft., Lansing-Kansas City 720 ft., Hunton 2,410 ft., elev. 896 ft.

North Central Texas

(Continued from page 141)

Mikton Oil Co. 1 J. M. Smith, Red River CSL, 1 mi. NE Rochester, dry, TD 5,641 ft., elev. 1,596 ft., Canyon reef 3,668-3,820 ft.

Panhandle Producing & Refining Co. 1 W. R. Woodward, C. Calliott Sur., 4½ mi. SW Haskell, dry, TD 5,791 ft., elev. 1,546 ft., Mississippian 5,680 ft.

Sojourner Drilling Co. 1 H. O. Kelso, 63-9-W. Walker, 3 mi. S Haskell, dry, TD 5,429 ft., Flippen 2,165 ft., Palo Pinto 3,715 ft., Strawn 4,272 ft.

Jack County: Smith & Nooner 2 W. E. Hunt, SPRR Sur., 7 mi. SE Antelope, dry, TD 530 ft.

Jones County: Westates Petroleum Corp. of Texas 1-9 Chittenden, 335-9-Louis Kratz Sur., 1 mi. S Radium, dry, TD 5,715 ft., elev. 1,710 ft., Dothan 2,208 ft., Flippen 2,630 ft., King 3,026 ft., Swastika 3,142 ft., Caddo 5,410 ft., Mississippian 5,535 ft., Ellenburger 5,613 ft.

Woodley Petroleum Co. 1 J. L. Douglas, 28-18-T&P, 5½ mi. S Noodle, dry, TD 4,900 ft., elev. 1,814 ft., Palo Pinto 4,435 ft.

Montague County: Konrad Sztykgold 2 Minnie Littell, G. E. Givens Sur., 5 mi. SE Mallard, dry, TD 6,875 ft.

Stonewall County: Southern Minerals Corp. 1 Yakey, T. J. Jordan Sur., 4 mi. N Old Glory, dry, TD 6,394 ft., elev. 1,626 ft., Bend conglomerate 6,019 ft., Ellenburger 6,272 ft.

Taylor County: Drilling & Exploration 1 Flora Harris, 62-19-T&P, 3½ mi. SW Merkel, dry, TD 3,215 ft., Dothan 2,400 ft., Camp Colorado 2,500 ft., Flippen 2,806 ft.

Wichita County: A. R. Dillard 1 Emma Kroettinger, Cherokee CSL, 2½ mi. S Wichita Falls, dry, TD 4,521 ft.

Young County: L. T. Burns 1-C Dunagan, TE&L Sur., 6 mi. SE Olney, dry, 5,119 ft.

C. B. Christie, Jr. 2 J. T. Sims, TE&L Sur., edge of Jean townsite, dry, TD 3,200 ft.

R. W. Darden and Joe Worsham 1 H. E. Neeley, TE&L Sur., 4 mi. SW Olney, dry, TD 1,210 ft.

Ray C. Fish 1 A. M. Eddleman, W. M. Byerly Sur., 2½ mi. S Padgitt, dry, TD 5,013 ft.

Mid-Continent and Rankin & Pitcock 1 Bullock, TE&L Sur., 2½ mi. SE Newcastle, dry, TD 4,860 ft., Caddo 4,071 ft., Chappel 4,766 ft., Mississippian 4,768 ft.

Warren Oil Corp. 1 Agnes Deats, Emily Kellum Sur., 8 mi. SE Graham, dry, TD 4,755 ft., Caddo 3,768 ft., Marble Falls 4,228 ft.

EQUIPMENT MEN . . . in the News

Hunt Tool Co. Announces Purchase of Turney Patents

T. N. Hunt, president of Hunt Tool Co., Houston, has announced the purchase of the Turney drawworks patents. Hunt Tool is now manufacturing the draw works, with many improvements, in its Houston plant, in addition to its present line of swivel joints, coring tools, drilling bits, and its new hydraulic-pulling tool.

Sales Force Expanded by Fluid Packed Pump

Sidney Shuman, general sales manager of Fluid Packed Pump Co., manufacturer of Oilmaster Down-Well Pumps, has announced two additions to the sales force.

V. A. Kelly, formerly district salesman at Snyder, Tex., has been made division engineer for North and West Texas.

Herb Risner, formerly with American Iron & Machine Works, has joined Fluid Packed Pump's California sales force with headquarters at Los Nietos.

A. V. Leslie Named Hughes Tool Director

Election of A. V. Leslie, Los Angeles, as a director of Hughes Tool Co. has been announced by Fred W. Ayers, of Houston, senior vice president of Hughes. Leslie became treasurer of the firm several months ago.

In addition to his duties with Hughes, Leslie is also a director of Trans-World Airlines. Howard Hughes, head of Hughes Tool, is majority stockholder of T.-W.A.

Lane-Wells Establishes New Truck Locations

Sterling, Colo., is the site of a new truck station established by Lane-Wells. With the district office at Casper, Wyo., a station at Cody, Wyo., this addition gives Lane-Wells three points from which to serve the Rocky Mountain area. Operator of the new station is James K. Wagoner, who has been with Lane-Wells for 3 years in the Casper area.

The Arklatex district office has been moved to new and enlarged quarters at Shreveport. All personnel remain the same at the new district headquarters, of which K. K. Gage is superintendent.

The Houma, La., subdistrict office has been moved to a new location 3 miles north of Houma.

The Jacksboro truck station has been moved to Bowie, Tex., in the North Central Texas district. Warren W. Lambert, who has served with Lane-Wells at Wichita Falls since 1944, is superintendent.

Yorston Joins Bethlehem As Sales Engineer

MARK YORSTON

Mark Yorston has been added to the staff of Bethlehem Supply Co. as a sales engineer, according to a recent announcement by Wendell M. Jones, vice president and general manager.

Yorston joined Bethlehem after several years' affiliation with the purchasing department of J. B. Gill Co., constructors and engineers, of Long Beach.

Hagn Addresses Cost Conference at Houston

H. J. Hagn, vice president and general manager of Well Equipment Manufacturing Corp., Houston, was one of the principal speakers at the Houston Regional Cost Conference which was held April 5-7.

Hagn's discussion of "Simplified Manufacturing Job Cost for the Oil Tool Industry" was a case study of job cost applied to equipment manufactured for the industry.

The three-day regional conference was attended by approximately 500 members of the association from Oklahoma, Louisiana, Mississippi, Alabama, Colorado, and Tennessee.

The National Association of Cost Accountants is an organization of more than 26,000 members with over 100 chapters, devoted to improving the standards of industrial accounting by a broad exchange of information and experience.

Executive Assignments Announced by A. O. Smith

Several executive assignments in A. O. Smith Corp. were announced recently by J. M. Floyd, executive vice president.

C. R. Rigby was named group executive in charge of the company's plant at Houston. The Houston Works manufactures pressure vessels, liquefied petroleum gas systems, and vertical-turbine pumps.

C. R. RIGBY

F. S. CORNELL

F. B. Dunn, former manager of the Houston Works, was placed in charge of personnel for both the Houston Works and the company's entire southwest district-administrative area, which covers eight states.

F. S. Cornell, manager of A. O. Smith's plant at Kankakee, Ill., was appointed group executive for the Kankakee Works, the eastern motor division at Tipp City, Ohio, and the company's heating division in Toledo.

Cornell will make his headquarters in Kankakee and will continue for the present as manager of the Kankakee Works.

Trailmobile Establishes New Factory at Houston

Establishment of a new factory branch in Houston, and the appointments of three new branch managers, are announced by William A. Burns, Jr., vice president of The Trailmobile Co., manufacturer of commercial truck-trailers, with plants in Cincinnati, Springfield, Mo.; Berkeley, Calif., and Windsor, Ont., Canada.

John D. Parobek, formerly in the company's sales management department in Cincinnati, is the new Trailmobile branch manager in Houston. Thomas Peacock, formerly manager of the company's subbranch in Greensboro, N. C., has been appointed branch manager in Charlotte, N. C. Robest S. Sawyer, formerly resident salesman for the company in Amarillo, has been appointed branch manager in Oklahoma City.

Parobek joined Trailmobile in 1945

as a salesman in the Cleveland territory. He had previously been associated with CCC Highway, Inc., in Cleveland. Peacock has been with Trailmobile since 1948, first as a salesman in the Charlotte branch and later as manager of the subbranch in Greensboro. Sawyer has been with Trailmobile for 4 years as a salesman at Amarillo. He had previously been with Southwest Wheel Co. as a salesman in Oklahoma and Texas.

Smith Names Madsen to Manage Los Angeles Basin

Promotion of Gene Madsen to Los Angeles Basin sales manager for H. C. Smith Oil Tool Co. was recently announced. Madsen has been active in a sales and service capacity with the company for the past 10 years and prior to his new post was branch manager at Newhall, Calif.

Madsen will make his headquarters at the company's main office and plant at Compton, Calif.

Braun Named Controller by California Concern

C. Allan Braun was recently named controller for C. F. Braun & Co., of Alhambra, Calif. Among departments Braun has managed during his 18 years with the company are purchasing, estimating, communications, and publicity.

Early this year Braun took over many of the responsibilities of controller, as assistant on financial controls. In addition to his new duties as controller, Braun will act as budget director and coordinator of financial systems.

Poppe Named Advertising Manager for Yale & Towne

Appointment of Fred E. Poppe as advertising manager of the Philadelphia division of Yale & Towne Manufacturing Co. has been announced by James A. Shellenberger, director of advertising, publicity and market research. The new appointment represents an expansion of this department for greater operating efficiency.

Poppe comes to Yale's materials-handling division from Fuller & Smith & Ross, New York advertising agency, where he was engaged in copy-contract work.

Sales Meeting Held By Guiberson in Dallas

Guiberson sales personnel attending the meeting at Dallas were, kneeling: R. L. Lindsay, Wichita Falls; C. E. Lance, Seminole; H. M. Cherry, Houston; L. T. Ferguson, Evansville; E. W. Nolan, Jr., Odessa; R. Z. Mendenhall, Victoria; E. L. Kilgore, Alice; D. L. Fry, Hobbs, and S. D. Beckley, New York. Standing are: R. L. McAdams, Lafayette; R. J. Foreman, Lafayette; A. E. Brummett, Houma; B. M. Matthews, Houston; C. L. Forcum, Longmont; O. A. Hess, Dallas; G. P. Thomson, Longview; H. S. Zane, Jr., Dallas; D. B. Craver, Kilgore; A. P. Smith, Dallas; D. L. Moss, Odessa; R. H. Washburn, Houston; Frank Bridwell, Abilene; E. E. Embury, Los Angeles; J. P. Killingsworth, Duncan; C. A. Teel, Odessa; R. A. Day, Oklahoma City; J. T. Anderson, Brownfield; and D. L. McGill, Dallas.

More than 30 representatives, executives, and field men from the Guiberson Corp. domestic and foreign sales territories attended a 3-day sales meeting in Dallas, March 14 to 16. Discussions of proposed new equipment and improvement of present oil-field equipment highlighted the meeting.

High spot was the demonstration of continuous or intermittent flow of the type "A" valve for gas lift. Alex P. Smith, executive vice president and general manager said: "This is a step forward reflecting the corporation's policy of providing new and improved equipment to fit the needs in the field."

Commenting on the meeting, Harry S. Zane, Jr., Guiberson sales manager, said: "The movement of Guiberson tools to the field is at a peak as of now. Sales are at an all-time high in the company's history. Never before have we maintained as large a staff of expert field men as we do now."

Jones Made Babcock & Wilcox Denver Agent

David M. Jones, Jr., Denver, has been made sales agent for The Babcock & Wilcox Tube Co. in the Rocky Mountain area, according to an announcement made recently by Edward A. Livingstone, vice president in charge of sales for the company.

Jones graduated from Lehigh University in 1938. Until mid 1949 he was in the sales department of Carnegie Illinois Steel Corp. and located in its Chicago, Cincinnati, and Denver offices. Since 1949 Jones has been acting as a sales representative in the Rocky Mountain states for a number of prominent steel and steel product manufacturing concerns.

Long Interests Purchased by Leco Manufacturing Co.

W. P. COOK

Leco Manufacturing Co. has purchased the business of Jon R. Long, of Fort Worth. Long has been in the business of manufacturing oil-well-pumping equipment at the same location for 25 years, and pioneered the development of stainless-steel balls and seats and valve equipment. Leco will continue the manufacture of the established line that has been marketed under the trade name of Nu-Alloy and K-Alloy pumping equipment.

Paul Cook, general manager of Lamtex Equipment Corp., assumes management of Leco. C. O. Vinnedge, Jr., will be plant manager, and Jon R. Long will remain with the organization as salesman-at-large.

Geophysical Firm to Erect 140-Ft. Masonry Building

General Geophysical Co. has commissioned Zimmerman & Bible, architects and engineers, to prepare plans and specifications for a 140-ft. masonry building with two 100-ft. wings to be erected on a 3½-acre site in Dallas.

E. W. Johnson, president of the company, which operates throughout the United States and western Canada, is negotiationg a contract for the construction of the new building to serve as a laboratory and shop building.

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Quantity	Size	Approx. wall	Description
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50,000'	2" O.D.	.140"	Recond. Seamless Tubing, P.E., 14' & Over.
50,000'	2¼" O.D.	.140"	Recond. Seamless Tubing, P.E., 14' & Over.
111,000'	2⅜" O.D.	.140"	3.2# Welded Line Pipe, P.E., 21' Lengths.
25,000'	2⅞" O.D.	.150"	4.5# Seamless Pipe, P.E., 16' & Over.
25,000'	3¼" O.D.	.145"	Recond. Seamless Tubing, P.E., 14' & Over.
60,000'	4" O.D.	.140/.160"	Recond. Seamless Tubing, P.E., 14' & Over.
75,000'	5⅝" O.D.	.258"	14.6# Lapweld, Beveled Ends, 20' RML.
25,000'	7" O.D.	.....	17# & 20# Good Used Lipe Pipe (Sub. for 6⅝" O.D. Standard Pipe)

TUBING & CASING

50,000'	2⅜" O.D.	.....	4# Good Used Lapweld Tubing, Range 1, with New 11½ V-Threads and Collars.
11,000'	2⅜" O.D.	.....	4.6# Good Used Seamless Range 2 10 Rd. Thd. Oil Well Tubing.
9,000'	2⅞" O.D.	.....	6.4# Good Used Seamless Range 2 10 Rd. Thd. Oil Well Tubing.
10,000'	5½" O.D.	.....	14# Used Lapweld Casing, T & C.
25,000'	5½" O.D.	.....	15½# Good Used Lapweld T&C Range 1 Casing.
5,000'	5½" O.D.	.....	17# Used Lapweld Casing, T & C.
15,000'	7" O.D.	.....	17# Good Used Lapweld T&C Range 1 Casing, 11½ V-Threads.
6,000'	7" O.D.	.....	20# Used Lapweld Casing, T & C.
3,000'	8⅝" O.D.	.....	25# Good Recond. Casing, T&C, Range 1, 8 V-Threads.
1,600'	10¾" O.D.	.....	32.75# Good Used Lapweld T&C Casing, Range 1 New 8 Rd. Thds. & 8" Long Collars.

THIS MATERIAL IS AVAILABLE FOR IMMEDIATE SHIPMENT, SUBJECT TO PRIOR SALE.

OTHER SIZES OF LINE PIPE, SEAMLESS TUBING IN SUITABLE SUBSTITUTE SIZES FOR STANDARD PIPE (EXCELLENT FOR GAS, GATHERING AND FLOW LINES), CASING AND TUBING AVAILABLE FOR IMMEDIATE DELIVERY.

FOR FURTHER INFORMATION, WIRE OR PHONE AT ONCE

A. J. STRUBEL, Broker

SIDney 1791 (Day Phone) HUDson 8152 (Night Phone) 4946 Murdoch, St. Louis, Mo.

EQUIPMENT FOR SALE

FOR SALE near Seminole, Oklahoma, one Braun, Size G portable distillation unit complete, Serial #7190, located in 24' x 40'-x18' Stefco steel frame sectional steel building. Price $10,000—Cities Service Oil Co.—Patridge—Bartlesville, Oklahoma.

OFFER FOR QUICK SALE
500 Standard 4-Inch
CAST IRON FLANGES
* *
2½ Gal. All Brass
FOAM FIRE EXTINGUISHERS
Morion I. Glass
8401 Wornall Rd., Phone HI. 4667
Kansas City, Mo.

EQUIPMENT FOR SALE

AVAILABLE for sale and immediate shipment line pipe, seamless and lapweld casing, tanks. Call or write Edco Pipe & Supply Company, Box 565, Drumright, Oklahoma.

FOR SALE: Galvanized Iron Pipe, diameters 1½" through 3" length 30" through 88" threaded for fill pipes or suction stubs for Gasoline Tanks. Armco Drainage & Metal Products, Inc., P. O. Box 1343, Atlanta 1, Georgia.

3,000-ft. rotary rig. Wilson PA 100 engine. 9D 7¼ x 10 pump. Climax 160 HP engine. 900 ft. 4½ FA Emsco swivel. Traveling block. Wire line. 38 ft. kelly. 32 ft. DC Elevators, Slips, Hook. $16,000 cash. Box D-958, The Oil and Gas Journal, Tulsa, Oklahoma.

EQUIPMENT FOR SALE

FOR SALE: At Oklahoma City Warehouse, 1 Allis-Chalmers Model UM-4 Skid Type Well Servicing Winch, $950.00. No mast—Cities Service Oil, Patridge, Bartlesville, Oklahoma.

IMMEDIATE DELIVERY and prompt erection on 2,500, 3,500 and 5,000 bbl. capacity riveted or welded tanks. Good condition. Address: P. O. Box 2297, Tulsa, Oklahoma.

1—WILSON Giant Draw Works, complete with Kelco Automatic Spinning Cathead and American Simplimatic Breakout Cathead, with two engine compound complete with friction clutches, air operated, pump drive, two LeRoi V-8 No. RXIV 8-cyl. Engines of 225 H.P. each, complete with starting engines, Sun Oil Filters, magnetos, and all trimmings including radiators. 228 joints 4½" O.D. used Seamless, Grade "D," Range 2, Drill Pipe, with Hughes Flashweld Tool Joints A.P.I. full hole. Wire or write 634 South Cheyenne, telephone 4-8163.

FOR SALE: Model 32 Special Walker-Neer spudder in A 1 condition. If interested call or write I. Weiner, P. O. Box 1224, Big Spring, Texas, or phone 1438, Big Spring, Texas.

WELL EQUIPMENT: New and used spudders, rotaries, core drills—all sizes and types. Cable tools, drill pipe, bits, pipe. Fishing tools. Everything for Well Service. Pressey & Son, Pueblo, Colorado.

1—3,000 GPM Fluor Atmospheric Tower, Model 23-A-15, California redwood; brass bolts, nuts and washers; copper nails; two distribution systems. Good condition. 1—Worthington pump, 1,500 gpm @ 30 ft. TDH, 1,800 rpm on base with 30 HP GE Motor. 1—Worthington pump, 800 gpm @ 110 ft. TDH, 1,750 rpm on base with 50 HP Motor. 1—Gould pump, 1,200 gpm @ 70 ft. TDH, 1,175 rpm on base with 35 HP Valley Electric Corp. Motor. 1—Ingersoll-Rand pump, 3,000 gpm @ 72 ft. TDH, 1,175 rpm with 100 HP Westinghouse Motor. All equipment available in May, 1951. Will sell all as a unit or separately. Located at 1100 East 21st Street, Wichita, Kansas. Derby Oil Company, P. O. Box 1030, Wichita, Kansas.

PRESSURE VESSELS

Quantity	Description—	Estimated working pressure
1	4' x 40' x 4" Forged Seamless	2,250
1	10' Dia. x 32-0" 1.75" shell-head 1.80" bottom-head 1.84" with series 30 outlets elliptical-heads, fusion welded construction	320
1	5' x 28' x 1" Riveted	250
1	6' x 35' x 1" Riveted and Welded	230
1	10' x 30' x ⅞" Riveted and Welded	120
2	9' 2" x 39' x 1 7/16" Riveted and Welded	221
2	4' 6" x 8' x ⅜" new-fusion code welded U-69-650° T	60
1	10-0 x 39-9 x 1⅛" x 1" HDs.—Riveted—3 Trays w/63 C.I. Bubble caps/tray—3 Baffle plates rated 750° F	75
1	10-0 x 52-6 x 1⅛" th x 1" Hds. Riveted—16 trays w/63 C.I. Bubble caps/Tray rated @ 750° F	75
1	5-0 x 44-7 x ⅜" Vacuum Tower w/11 Trays—new	175
1	6-0 x 28-0 x ⅜" Riveted—16 trays, spacing 16"	30
1	5-0 x 12-6 x 7/16" Riveted & Welded, 5 Trays—spacing 20"	100
1	5-0 x 30-0 x ⅜" Riveted & Welded w/Tulsa type mist extractor 10 trays—spacing 20"	120
1	3-6 x 50-0 x ½" th Riveted & Welded—4 trays w/16" spacing; 2-4 x 10-0 condenser on top	200

All Vessels Located in Our Yard in Kansas City and Offered Subject to Prior Sale

Write—Wire or Phone Norman Strauss

BROWN-STRAUSS CORP.

Phone HA. 1008 P. O. Box 78 Zone 10
Kansas City, Missouri

PIPE — IMMEDIATE DELIVERY

85,000 Feet standard 4 inch T & C
165,000 Feet standard 2½ inch T & C
35,000 Feet standard 2 inch T & C
15,000 Feet standard 3 inch T & C
40,000 Feet 4 inch invasion pipe
5,000 Feet 6 inch spiral weld, .134 wall
5,000 Feet 3 inch invasion pipe

All the above pipe located in Los Angeles for immediate delivery. We own this material.

GREAT WEST IRON & STEEL CO., INC.
1159 S. Broadway, Los Angeles 15, Calif.
Phone RI. 7-8798

COMPLETE DRILLING RIGS FOR SALE

1. **NATIONAL 50** Ideco 136' mast, National C-350 and G-D FXQ pumps. Two 12 cylinder LeRois on draw works and FXQ pump. Two Waukesha LROs on C-350.

2. **EMSCO GA-500** Ideco 136' mast, National C-350 and G-D FXQ pumps. Two GM Twin diesels on draw works and FXQ pump. One GM Quad diesel on C-350 pump.

3. **EMSCO J-750** Ideco 136' mast, G-D FXL and Emsco P-16 pumps. Three GM Twin diesels on draw works, power takeoffs to both pumps, two GM Quad diesels, one on each pump.

4. **NATIONAL 125** One Oilwell 220P pump, one Oilwell 20P pump, one W-S 7P pump. Four Waukesha LRO engines with National fluid couplings on draw works with takeoff to 220P pump, two Waukesha LROs with National fluid couplings on 20P pump, one Waukesha EKH on 7P pump.

5. **K-W RIG** Emsco UB-54 draw works with National reverse gear, Ideco 136' mast, National C-350 and Emsco CA-16 pumps, two 12 cylinder LeRoi gas engines on draw works, two Waukesha LROs on C-350 pump, one Superior 6G510 on Emsco pump.

EACH OF THESE RIGS IS COMPLETE AND READY TO DRILL. EACH IS FULLY UNITIZED FOR SPEEDY MOVING AND RIGGING UP. REASONABLY PRICED. FOR FULL PARTICULARS AND COMPLETE INVENTORIES CONTACT

Rocky Mountain Drilling Company

612 South Flower Street Los Angeles 17, California
Phone Michigan 6215

DIESEL ENGINES

450 HP at 2100 RPM General Motors Detroit Model 6-71 arranged in twins (225 HP per engine). Excellent condition.

BLOWERS

Roots - Connersville 16 x 18 5000 CFM, max. press. 10 lb.

HUGO NEU CORPORATION

31 Nassau Street
New York 5, New York

EQUIPMENT FOR SALE

NEW Double Drum Well Servicing Unit Double Pole, 140 Hp. Waukesha, Fully Equipped. Box D-940, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE near Madison, Kansas, 2 band wheel and one geared pumping powers complete. Cities Service Oil Patride—Bartlesville.

125 KW, 514 RPM, 3-phase, 60-cycle, 480 volts, Engine Type, Electric Machinery Generator, direct connected exciter. Alfred B. Kern, 223 Wright Bldg., Tulsa, Oklahoma.

FOR SALE: 24 L Bucyrus and 71 Star speed spudders equipped excellent condition. 240 Star with tools. C. A. McMillen, Titusville, Pa. Phone 3-1351 evenings.

FOR SALE: In Oklahoma—1 used 175 KW, 219 KVA, 480V, 264 Amp., 3 phase, 60 cycle, 1200 RPM—AC, Westinghouse generator (bought new 1935) Serial #1519N362, powered through Twin Disc clutches and V belts by Right & Left Rotation Sterling 150 HP 5¼" x 6", Gas, Gasoline, Butane 6 cyl. engines. Originally used for Rotary oil well drilling rig. $6,500.00. Cities Service Oil Co.—Patridge—Bartlesville, Okla.

FOR SALE: 2 Used Franks Mfg. Co., Tulsa, Core Drill Units, Model 1000—Mounted on Ford Trucks. Cities Service Oil Co.—Patridge—Bartlesville.

CATERPILLAR D-13000
Completely rebuilt and guaranteed. Priced right. Martin Tractor, Chanute, Kansas.

FOR SALE: 3500' of used 4½ drill pipe with 5¾" O.D. full hole tool joints. Melton Supply Company, Seminole, Oklahoma.

FOR SALE AT BARGAIN PRICES!!!

NEW GROOVE TYPE WELDING RINGS WITH KNOCK-OFF SPACER PINS

IN THE ORIGINAL CASES MANUFACTURED BY TUBE TURNS COMPANY

210—12" Rings for 12.75" O.D. Pipe
106—10" Rings Special for 10.75" O.D. Pipe—Wall Thickness .279"
5,250—10" Rings for 10.75" O.D. Pipe—Wall Thickness .279"

WRITE OR 'PHONE US FOR PRICES!!

DAVIDSON PIPE COMPANY, INC.
5002 Second Avenue
Brooklyn 32, N. Y.
Telephone: GEdney 9-8300

EQUIPMENT WANTED

SWIVEL
3" Kelly and hose for reverse Circulator. Standard Drilling Company, Phone 3-4406, Oklahoma City, Okla.

GOOD Used Small Rotary Mounted, capable of drilling 1.500'. Box 285, Iola, Kansas, or phone Office 355, Res. 278.

WANTED TO BUY OIL WELL TYPE ELECTRIC MOTORS

Ratings 15/30 Hp., 20/50 Hp. 25/65 Hp. Send listing on any other Motors, Control, Cable, Wiring Supplies.

Industrial Electric & Supply Co., Inc.
P. O. Box 1398 Memphis, Tenn.
Phone 37-1681

EQUIPMENT WANTED

WANTED: Good used well drilling equipment. Spudders, rotaries, large or small. Tools and general equipment. We distribute throughout the West with hundreds of customers. Pressey & Son, Pueblo, Colorado.

WANTED TO BUY—Good used drilling machine and equipment, capable of drilling to 3000 feet. Ralph M. Tolson, 816 Grandview, Pawhuska, Okla. Phone 834.

WANTED TO BUY: One good used 87' or higher cantilever mast with base less substructure, also one 3,000 gallon capacity butane tank. Gehring Equipment Company, P.O. Box 2290, Phone 4170, Casper, Wyoming.

WANTED TO BUY

Used Pressure Vessel in good condition, approximately 5'-0" diameter, by 70'-0" long, of ⅜" or ½" plate.

THE SHALLOW WATER REFINING CO.
Garden City, Kansas

HELP WANTED

FOREIGN and Domestic Oil Employment Directory covering the oil industry, showing where to apply for jobs. Price $5.00. Oil Industry Mailing List, Box 2603, Tulsa, Okla.

SALES ENGINEER with recent mechanical engineering degree to join organization handling equipment for refineries, gasoline and chemical plants in Houston. Experience not essential. Box D-948, The Oil and Gas Journal, Tulsa, Oklahoma.

FEMALE EXECUTIVE SECRETARIES: one for Dallas, one for Houston, for independent oil operators. Experienced in oil production. State age, marital status, description of self, complete qualifications. Box D-971, The Oil and Gas Journal, Tulsa, Oklahoma.

ALL-AROUND MAN for independent operator; with experience in completion, leasing and production, Tulsa area. Must have own transportation. State qualifications and salary expected. Box D-973, The Oil and Gas Journal, Tulsa, Oklahoma.

—Position Open—
ASSISTANT to VICE PRESIDENT

Major oil field equipment manufacturer has position open for Assistant to Vice President. Must be capable of developing defense contracts and new products sales. Give qualifications and experience. All communications confidential. Box D-955, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS

Process (Chemical) Engineers
Construction Engineers
Project (Mechanical) Engineers

To Work On
Petroleum, Petro-Chemical and Chemical Projects

Write in complete detail, giving positions held, references, education, salary expected. Personal interview can be arranged.

Address Personnel Department
E. B. BADGER & SONS COMPANY
75 Pitts St., Boston, Mass.

HELP WANTED

GEOPHYSICIST: Fully qualified and experienced for position of Chief Geophysicist with well-known contracting company. Application must state complete qualifications, references and salary expected. Box D-918, The Oil and Gas Journal, Tulsa, Oklahoma.

SEISMOGRAPH PARTY CHIEF and Computer wanted by new aggressive company. Box D-920, The Oil and Gas Journal, Tulsa, Oklahoma.

ENGINEERS, Executives, Technical Men. Salaried positions—$3600 to $30,000. This confidential service for outstanding men who desire a change of connection. Will develop and conduct preliminary negotiations without risk to present position. Send name and address for details. Tomsett Associates, 1204 Berger Bldg., Pittsburgh 19, Pa.

GEOPHYSICAL SURVEYOR: Minimum two years' experience on transit; do not apply otherwise. Box D-921, The Oil and Gas Journal, Tulsa, Oklahoma.

EXPERIENCED Seismic Party Chiefs, Computers, Operators, Surveyors, and Shot Hole Drillers. Box D-970, The Oil and Gas Journal, Tulsa, Oklahoma.

ELECTRICAL Engineer with crude oil pipe line experience. Familiar with design of electric pump stations, auxiliary electric machinery and equipment, remote control circuits, power sub-station and distribution circuits for installations up to 5,000 horsepower. Familiarity with communication circuits and electronic equipment also required. Include full professional and personal details first letter. Box D-933, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED: Two geologists for assignment Middle East. Must be single and have at least three years surface experience with good background in stratigraphy. Reply Box D-956, The Oil & Gas Journal, Tulsa, Oklahoma.

EXECUTIVE GEOLOGIST: A sizable company with headquarters in Tulsa engaged in various branches of the oil industry, but heretofore not extensively in the production branch, desires to contact someone who from ability and experience could take the lead in deciding on a slow but expanding production program and who could slowly but steadily get such a program started and under way—hiring from time to time qualified men to round out an adequate Exploratory Production Department, compensation would be on a salary basis only but commensured with experience and growth of activities under your supervision. Replies will be treated strictly confidential in all cases. Box D-957, The Oil and Gas Journal, Tulsa, Oklahoma.

ACCOUNTANTS—Integrated oil company in Kansas City area has openings in Pipe Line (ICC), Production and Refinery Departments offering opportunities for advancement. Applicants should have accounting degree or experience in one of above fields of accounting. Liberal retirement and other employee benefits. In reply give complete personal history. State salary expected. Replies confidential. Box D-968, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED—SAFETY ENGINEER

Large Insurance General Agency desires an experienced safety engineer for servicing oil industry accounts. In reply state qualifications and experience.

Box D-965, The Oil and Gas Journal, Tulsa, Oklahoma

WANTED:
PIPE LINE ENGINEER-ECONOMIST

Large integrated oil company wishes to engage in staff capacity an experienced pipe line engineer who has ability and experience in economic analysis of crude oil and products, pipe line facilities—both existing and proposed. Company does not have man specializing in this field. Location would be in home office in Eastern United States. Please state age, experience, and give references with first reply. D-964, The Oil and Gas Journal, Tulsa, Oklahoma.

HELP WANTED

WANTED by progressive independent an experienced lease and landman for North Central Texas. All replies held in strict confidence. Box D-960, The Oil and Gas Journal, Tulsa, Oklahoma.

WANTED:

Exploratory Geologist familiar with and preferably now residing in Southern Oklahoma. Must be aggressive and experienced. Fine opportunity with progressive Independent.

Box D-957, The Oil and Gas Journal Tulsa, Oklahoma

PROCESS ENGINEER

To be located in Tulsa, Oklahoma, to work on projects in Petroleum and Petro-Chemical field. Operating experience desirable but not required.

Letter should include details of education, experience, family and military status, and salary expected. Personal interview can be arranged.

Chemical Plants Division

BLAW-KNOX CONSTRUCTION COMPANY

Box 1266 **Tulsa, Oklahoma**

SITUATIONS WANTED

ATTENTION: Well established oil well drilling contractor desires to manage and supervise: Individuals', groups', small or medium-sized oil companies' drilling, production and operating problems in Central and Western Texas, and New Mexico Personal interview by appointment is desired. Makin Drilling Company, Box No 131. Ph. No. 131, Hobbs, New Mexico

DRILLING Contractor operating in West Texas and New Mexico desires to contact small or medium-sized independent oil company who needs an operating manager. Personal interview desired. Twenty years experience in all phases of the oil industry. Address replies to Box D-644, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOPHYSICIST 15 years experience available July seeks permanent location supervising interpreting reviewing seismic gravity magnetics in Caribbean Area, Brazil, Mexico, Peru. Box D-937, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST-LANDMAN. Wide and varied experience, now with major company and wishes to remain in Rocky Mountain Area. Capable of taking complete charge of operations. Desires salary-interest or will consider retainer basis. Box D-929, The Oil and Gas Journal.

GEOLOGIST: Age 35, married, 12 years major and independent company experience in Texas and Louisiana Gulf Coast, Southwest Texas, West Texas-New Mexico. Desire connection with Active independent. Excellent references. Box D-952, The Oil and Gas Journal, Tulsa, Oklahoma.

GEOLOGIST, Ph.D. candidate, over five years experience, seeks employment anywhere with oil company or consultant. Write L. Banks, 300 Elm Road, State College, Pa.

FORMER Independent Oil Operator ten years, with legal education, plus eight years Wall Street experience, desires connection raise funds exploratory well drilling from excess profits taxpayers. Box D-938, The Oil and Gas Journal, Tulsa, Oklahoma.

PUBLIC ACCOUNTANT located in Tulsa can handle additional part time bookkeeping and tax clients. 25 years' experience. P. O. Box 812, Tulsa, Oklahoma.

ATTENTION law suits and damage cases. Experienced legal photographer desires permanent position with oil company or will contract on specific job. Will travel Gulf Coast area. Now connected with large commercial studio. Age 42. J. A. Glass, 5524 Fairbanks Street, Houston. Night phone only—MY 6696.

SITUATIONS WANTED

PETROLEUM Engineering Graduate, Okla. U. 3 yrs. experience drilling, production and sales major oil company. Desire position with development company, royalty company or small oil company in executive assistant capacity. Officer in U.S. Marine Corps to be relieved active duty April. Desire interview with prospective employer. Reference. Box D-966, The Oil and Gas Journal, Tulsa, Oklahoma.

LEGAL BLANKS

BURKHART LEGAL BLANKS since 1908. Oil-Gas (all states), Business, Real Estate, Legal Forms, Leases, Revised With Government Regulations, Commercial Printing Catalog and Samples on request. Burkhart Printing & Stationery Company, 115 South Cincinnati, Tulsa 3, Oklahoma.

PATENT ATTORNEYS

PATENT Practice before U. S. Patent Office. Validity and Infringement Investigations and Opinions. Booklet and form "Evidence of Conception" forwarded upon request. Lancaster, Allwine & Rommell. Registered Patent Attorneys, Suite 418. 815-15th Street, N.W., Washington 5, D. C.

FOR SALE—MAPS

STRUCTURAL and geologic map with geologic report covering the entire San Juan Basin in Northwest New Mexico and Southwest Colorado. Covers 15,000 square miles, contours on Dakota sandstone from latest information. Map-scale one-quarter inch to mile, 36 by 42 inches, original and copyrighted. Box D-969, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR RENT

TANK SPACE AVAILABLE FOR RENT

2—20,000 BBL. TANKS
ON R. R. TRACK
GOOD HIGHWAY
CHICAGO SWITCHING DISTRICT
BOX A, LYONS, ILL.

FOR SALE

FOR SALE

Bauxite decolorizing agent, activated, granular, in 100 lb. cotton bags. Inspection invited.

33,000 lbs. unused.
157,000 lbs. slightly used and reactivated.

Sale: As is, F.O.B. Yonkers, rail, truck or barge. Address: P. O. Box 509, Yonkers, N. Y.

ROYALTIES

WE will buy your producing override royalties and oil payments, no matter how small. Emray Oil Co., B. R. Irwin, President, 1045 Electric Bldg., Houston, Texas. Phone—Charter 3479.

DEEDED ROYALTIES
San Juan Basin & Permian Basin. Write Harry S. Wright, Wright Bldg., Farmington New Mexico.

MONTANA ROYALTIES
Millions of acres now leased by world's major companies, with huge drilling play in prospect. For booklet describing Montana geology and oil development, write Landowners Royalty Company, Box 1225, Great Falls, Montana.

PRIVATE PARTY wants to invest up to $150,000.00 in producing royalties or settled production. Small or large deals considered. Box D-912, The Oil and Gas Journal, Tulsa, Oklahoma.

LEASE AND DRILLING BLOCKS

OIL DEALS WANTED
Independent Operators seeking immediate drilling deals with good geology. Box D-972, The Oil and Gas Journal, Tulsa, Oklahoma.

FOR SALE: Oil and Gas Leases adjoining producing leases, also wildcat leases, Drilling propositions and small producing properties; all in shallow territory. W. P. Harley, Bowling Green, Ky.

ARIZONA five-year leases and drilling blocks, good geology, 620 Luhrs Building, Phoenix, Arizona.

WATER flood prospect in Allen County, Kansas, now available for salvage plus limited override to a responsible operator only, preferably one with water flood experience. Approximately 100 proven acres of Bartlesville sand—700' deep—32 gravity oil. One core (good) taken by owners—coring option if desired. Box D-949, The Oil and Gas Journal, Tulsa, Oklahoma.

DEVELOPMENT Contract, Several Drilling Blocks having attractive geology. Also Natural Gas Distribution and Development project having 500 possible taps. Old oil production for sale. C. P. Taneyhill, Industrial Engineer, P.O. Box 304, Bowling Green, Kentucky.

A GOOD SPECULATION in oil development is filing on Government Lands in potential developing areas. Write: S. W. Pressey, Box 614, Pueblo, Colorado.

ATTENTION CAPITAL OIL INVESTORS. We have large acreage offsetting 400 bbl. well acreage in Ill. Also acreage in Okla., Kansas ready to drill. We can present at this time the work of our oil locator instrument, which works only on oil in the structures. Acreage surveyed by instrument which has proven accurate in last thirty wells surveyed. This is your opportunity for good investment. If interested in helping finance above acreage, write: Anglo-American Co-Operative Oil Co., 69 West Washington St., Suite 1209, Chicago, Ill.

240 ACRE LEASE in Wabash County, Southern Illinois, for assignment to right party for drilling contract and override. Can furnish section location, has lime, sand formation, also good pumper. Lease is ¼ mile from pipeline. For all information write: Mrs. Grace V. Tanquary, 438 Plum Street, Aurora, Illinois.

WANTED

WANTED

WANTED

LEASES FOR SALVAGE PURPOSES

Pipe Lines and Gathering Systems
Tanks, Pumping Units, Casing, Tubing

Immediate Inspection——Get Our Offer Before You Sell

OILFIELD PIPE & EQUIPMENT BOUGHT, SOLD & TRADED

BROWN PIPE & MACHINERY CO.

P.O. Box 2368 **Phone 3-9391**
Corpus Christi, Texas

API Pipe Threading With Latest Landis Machines

LEASE AND DRILLING BLOCKS

PLANNING to develop a partly proven oil-gas field in Allegany County, N. Y. Interest may be had for cash or good used casing, drive pipe and well equipment. If interested, write for details. C. N. Wilber, Box 625, Westfield, Pa.

FOR SALE small lease close to production in good North Louisiana gas distillate field where there is lots of activity. Owner, Box 33, Arcadia, La.

OWNER OF LEASES Offsetting production, Strawn sands prevail, no water. Sand at sixteen hundred, twenty seven hundred. Expect good results with Hydrafrac. Wants development. Box 551, Breckenridge, Texas.

LEASES ROYALTIES

Producing and Nonproducing
Bought and Sold—Any Area
Inquiries Invited

B. D. BUCKLEY
6635 Delmar Ave., St. Louis 5, Mo.

REAL ESTATE

60 A. ESTATE, Orange County, Calif. Part Citrus. Excellent location, 22 miles L. A. City Hall. Leased to Major Oil Co. 50% mineral rights, $1750 per acre. Terms. FRontier 28138, R. D. Freed, 438 30th St., Hermosa Beach, Calif.

STOCKS FOR SALE

Petroleum Exploration, Inc.

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Subject to prior sale and change in price, we own and offer any part of

900 Shares

(Minimum sale — 25 shares)

at $37.50 per share net.

Cohn & Co.

Investment Securities
MEMBERS
New York Stock Exchange
One Wall St., New York 5, N. Y.
Teletype NY 1-1058

Permian Basin

(Continued from page 149)

TD 5,402 ft., elev. 3,730 ft., San Andres 4,755 ft.

TEXAS PANHANDLE (DISTRICT 10) WILDCAT FAILURES

Briscoe County: Midstates Oil Corp. 1 Hickok & Reynolds, C. L. Craig Sur. 2725, 12 mi. N of SE corner of county; dry, TD 8,299 ft., elev. 2,362 ft., base San Andres 1,530 ft., White Horse 1,680 ft., Wichita Albany 3,050 ft., Wolfcamp 3,660 ft. (driller's), Canyon reef 5,374-6,130 ft., Strawn 6,320 ft., Morrow 7,110 ft., Chester 7,292 ft., Hickory sand 8,065 ft., pre-Cambrian 8,085 ft.

Donley County: W. A. Parker 1 C. Inman, 32-C2-GCSO&RGNG, 3 mi. W Jericho, dry, TD 3,191 ft.

SOUTHEASTERN NEW MEXICO

HOBBS.—In Eddy County, Continental Oil Co. 1 Thurman-Federal, a wildcat in 11-16s-27e, recovered 30 ft. of heavily gas-cut mud on a 1½-hour drill-stem test of the Mississippian at 8,548-8,628 ft. Drilling continued below 8,653 ft. in the lime and chert. The wildcat is about 28 miles south of the Chisum pool of Chaves County.

In northwestern Lea County, Lawton Oil Corp. 1-A State, 30-15s-33e, perforated in the Pennsylvanian from 10,577-617 ft. and treated with 4,000 gal. of acid. The well kicked off and flowed 44 bbl. of oil an hour for 2 hours through ⅛-in. choke, and was shut in for storage.

Tide Water Associated Oil Co. completed its 1-PD State, 32-16s-37e, as a flush Pennsylvanian discovery east of the Lovington field. Following acid treatment, the wildcat rated a daily potential of 722 bbl. of 41°-gravity oil, flowing through ½-in. choke from perforations at 11,080-100 and 11,130-150 ft. Other tests had increased possible production from the Tubb zone, and gas-distillate in the Mississippian.

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Youngstown Sheet and Tube Company Inside Back Cover

LEGAL

Sealed bids for oil and gas mining leases on certain trust lands on the Crow Indian Reservation, Big Horn County, State of Montana, will be received at the Office of the Superintendent, Crow Indian Agency, Crow Agency, Montana, up to 2:00 o'clock, P.M., Montana Standard Time, April 27, 1951. For further information, call or write L. C. Lippert, Superintendent, Crow Indian Agency, Crow Agency, Montana.

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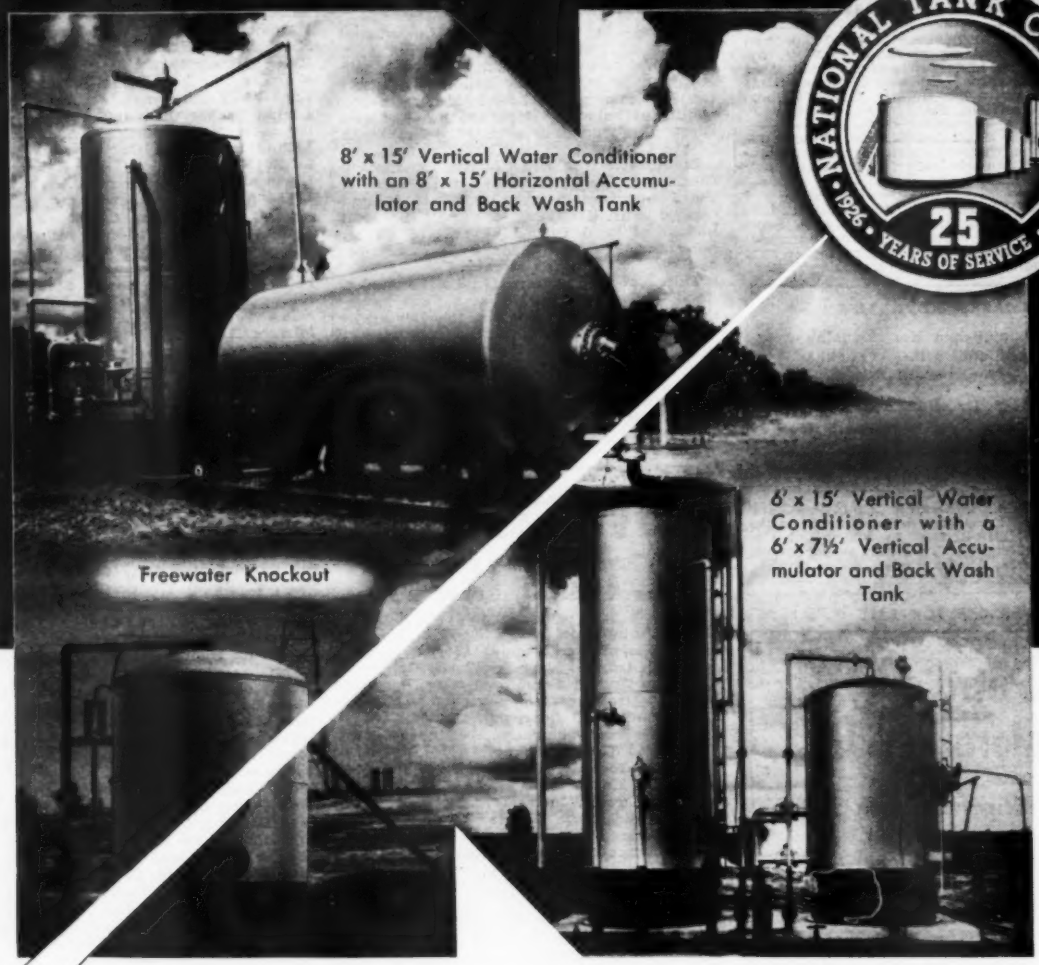
8' x 15' Vertical Water Conditioner with an 8' x 15' Horizontal Accumulator and Back Wash Tank
Freewater Knockout
6' x 15' Vertical Water Conditioner with a 6' x 7½' Vertical Accumulator and Back Wash Tank

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TULSA, OKLAHOMA

XUM

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Why the sea is salty

IN Norse mythology, a poor man got a magic mill from the elves. With it he could grind whatever he wanted--food, clothing, furniture, and best of all, gold. Of course, the poor peasant's lot changed from poverty to riches.

An envious brother borrowed the mill. He commanded it to "grind herrings and broth and grind them good and fast." But having taken the mill in such haste, he didn't know the magic words to shut it off. He was almost drowned in broth when the brother came to the rescue.

Finally, the magic mill was stolen by a salt dealer, who put it on his ship. Safely at sea, the skipper demanded, "Grind salt and grind it good and fast." Alas, he hadn't learned the control words either. The mill ground salt endlessly, filling all his kegs and his hold, covering the decks and at last sinking the ship. There at the bottom of the sea, so people say, the magic mill still grinds--and that's why the sea is salty.

From time immemorial, men have dreamed about magic mills and schemes to bring abundance and riches. Here in America, today, there are plans that are flooding us with superabundance of certain commodities. But what about the magic words to shut off the mill?

Isn't it time we see the truth in this ancient Norse myth, that "too much" is just as foolish as "too little?" We may well remember this first law of economics: In a *free* market, supply can adjust itself to demand--whether it be potatoes or steel--without sinking the ship. Here is a must job for all thinking Americans.

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XUM

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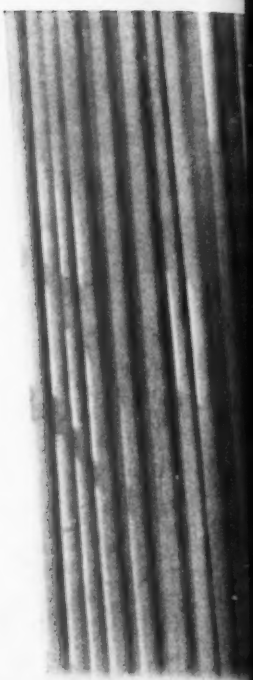

IN MILLIONS OF FEET OF HOLE, drilled in thousands of wells, Hughes Flash-Weld tool joints have set a record for unequaled dependability.

There's a very solid reason for this. Fifteen years ago, Hughes undertook the designing of a better type of drill stem. Engineers and metallurgists spent three years in full-scale research in developing the welded-type joint and the specially designed flash-welding machines and process now used.

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There has been no known failure in the weld of a Hughes Flash-Weld tool joint processed in the past two years.

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